

7  
IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

# **DIESEL**

## **PROGRESS**

INCORPORATING  
**GAS TURBINE**  
**PROGRESS**



FIVE DOLLARS PER YEAR

JANUARY 1959

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**NEW**

## SAFE-T-GENERATOR DESIGN

*New Safe-T-Generator is designed to eliminate spark producing components*

Delco introduces a new Safe-T-Generator designed specifically for off-shore oil rigs, railroad refrigerator cars, shipboard uses, abrasive dust areas and troublesome weather conditions. This new generator has no commutator, slip rings or brushes to cause sparks. Instead, the conventional exciter with its DC commutator is replaced with an AC exciter employing Silicon Rectifiers. This new and improved design not only eliminates the dangers of arcing, but cuts maintenance problems to a minimum.

The Safe-T-Generator offers the same rugged dependability for which Delco's standard conventional generators have long been noted. Get all facts—get in touch with your local Delco Products Representative and find out how this new, safer generator can mean longer trouble-free life in your operation.



*Wherever power is required  
from 10 kw to 300 kw,  
there is a Delco generator  
to meet the need.*



**DELCO  
MOTORS**

*Delco Products, Division of General Motors, Dayton, Ohio*

- APPLIANCE MOTORS • INDUSTRIAL MOTORS
- GENERATORS • ACTUATORS
- AUTOMOTIVE AND HYDRAULIC EQUIPMENT
- HERMETIC MOTORS AND CONTROLS
- RESIDENTIAL GARAGE DOOR OPERATORS
- AIR SUSPENSION COMPONENTS



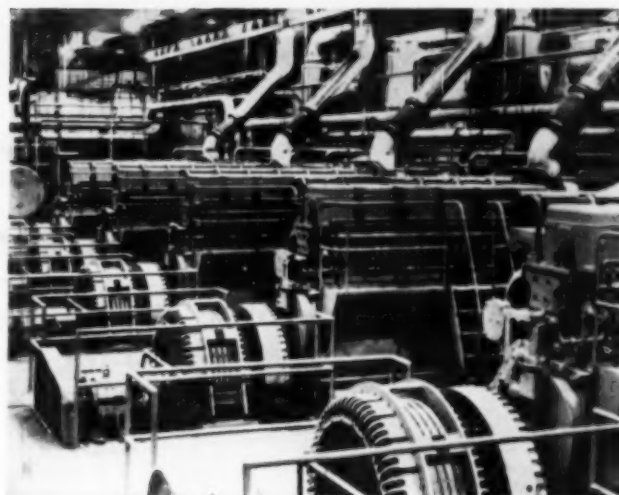
(official U.S. Air Force photo)

## NORDBERG ENGINES help power SAGE System Direction Centers of the Air Defense Command

"Master-minding" the tactical operation of U.S. Air Force interceptors like this F-102 jet is an amazing electronic air defense system called SAGE . . . *Semi-Automatic Ground Environment*. By analyzing a variety of air surveillance information which is received from a vast network of facilities and fed into electronic digital computers located at its Direction Centers, the SAGE System computes the speed, altitude, and direction of planes in flight to facilitate identification. A picture of the air and defense situation is displayed so clearly that Air Force personnel can quickly decide when and where to intercept, should aircraft be identified as suspect. The system also monitors the deployment of selected air defense weapons.

The Direction Center computing and display equipment relies on station-generated electric power. To help assure adequate power at all times, Nordberg Diesels have been installed in several Direction Centers.

*Nordberg Mfg. Co., Milwaukee 1, Wisconsin*



Nordberg four-cycle diesels installed in one of the SAGE system centers, generating electric power for the electronic computers, communications equipment, etc. Each of the Nordberg supercharged 6-cylinder engines is rated 930 hp at 450 rpm and is monitored electronically.

# NORDBERG

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P858



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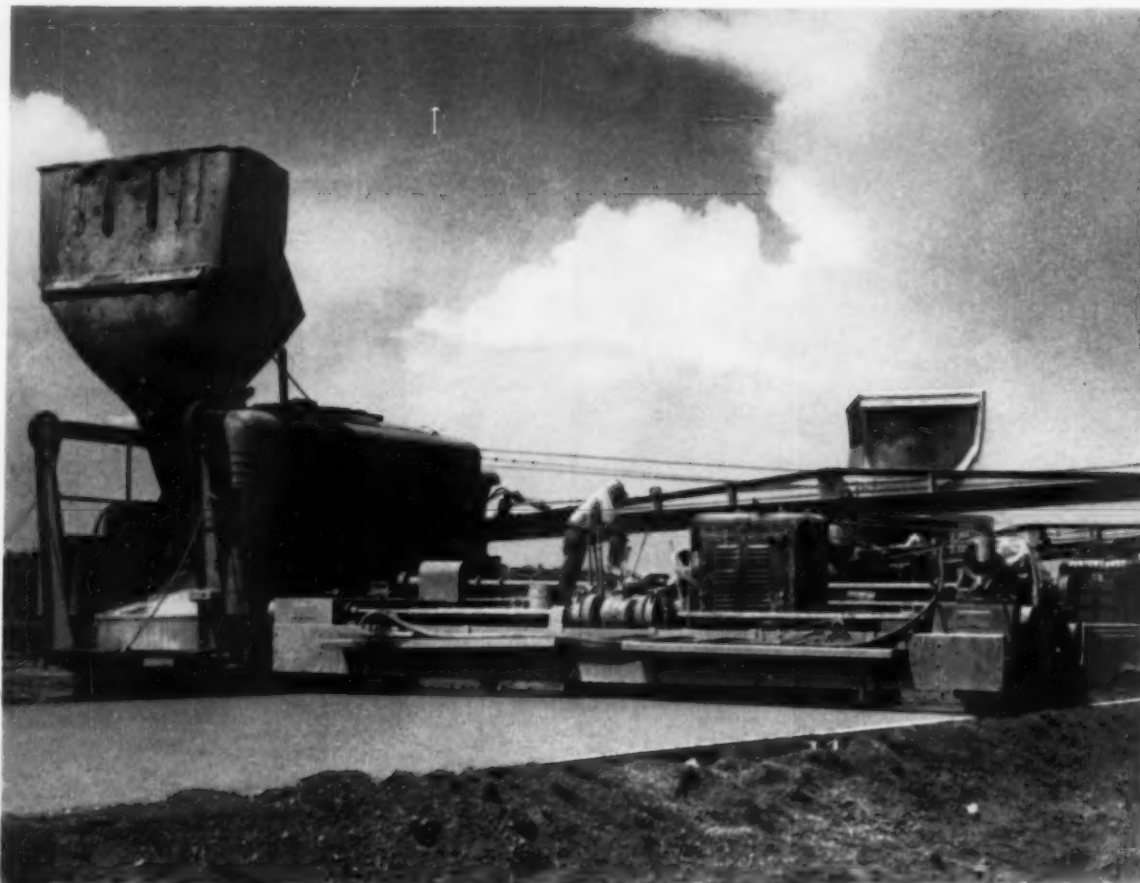
GRINDING MILLS—  
KILNS AND  
PROCESS MACHINERY



RAILWAY  
MAINTENANCE  
EQUIPMENT



## CONCRETE EXAMPLE OF GENERAL MOTORS DEPENDABILITY



**HARRISON-cooled Diesel power paves the way for new record of 6,029 feet of 9-inch concrete highway in 12½ hours**



Harrison Heat Exchangers  
—Top-Quality Products  
of General Motors Research and Engineering.



*You're always on the right road with Harrison!* Whether you're unfurling a ribbon of highway in record time . . . or maintaining around-the-clock, heavy-construction schedules, Harrison takes complete control of vital operating temperatures. For example, a stretch of concrete 24 feet wide, 6,029 feet long and 9 inches deep was laid in 12½ hours, using Harrison-cooled Diesel power for the Rex pavers and portable batch mixing plant. Harrison heat-transfer equipment is rugged, reliable and highly efficient. That's why leading manufacturers specify Harrison heat exchangers for *all* types of Diesel applications. Harrison meets every cooling challenge with over 48 years' experience in the heat-transfer field. So, if you have a cooling problem, look to Harrison for the answer.



HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK



# DIESEL PROGRESS

INCORPORATING  
GAS TURBINE  
PROGRESS

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IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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### FRONT COVER ILLUSTRATION

Mystic VIII, 60 ft. yacht designed and built by Huckins Yacht Corp. is powered by twin GM 6-71 diesels. Owned by P. R. Malory, vessel has a top speed of 28.1 mph.



## Birth of A 20 Ton Sailor

Looks like any other *seventy-two* inch steel ingot—but is it? Trained down to fighting weight, it is a *twenty* ton sailor aboard an oil tanker . . . a ship's shaft to turn propellers against the heavy seas of the North Atlantic. Its "trainers" . . . experts in forging, heat treating, machining . . . men of long experience in quality control carefully check every step of the way to make sure

it holds its "rating" in the ship's company. Steel forgings and castings for naval and maritime fleets are completed here from raw materials to shipping dock . . . have been for over three quarters of a century. Another of the many important reasons you can consult with us on *your* Steel Forging and *your* Steel Casting Components with full confidence.

## ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

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## ENGINEER'S FIELD REPORT

**CHEVRON PRESSURE  
PRIMER SYSTEM**  
**JONES-TOMKINS CO.**  
FIRM Cougar, Washington

# Special cartridge fires giant diesel in seconds



At world's highest earth-filled dam construction site near Woodland, Washington, three giant diesel shovels get immediate starts from Chevron Pressure Primer System, reports Jones-Tomkins, general contractors. System helps speed shovel's fill-borrowing operations for this \$51,000,000 project.

Five-year-old 4500 Manitowoc Speed Crane (above), powered by Caterpillar 350 h.p. V-12 D397 engine, operates 18 hours a day, six days a week, loading 21-yard dump trucks in just 70 seconds. Jones-Tomkins uses Standard fuels and lubricants exclusively on this job.



**Chevron Pressure Primer Discharger** mounted on instrument panel (left) operates satisfactorily despite heavy vibration, reports shovel foreman Henry Watson (right). "We've had absolutely no trouble with this system. The Chevron Pressure Primer System eliminates dust clogging and allows fluid to reach the cylinders quickly. It's the practical way we've found to get these rigs going."



TRADEMARKS "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.  
STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20  
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

### Why Chevron Pressure Primer System assures fast starts



- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even at -65°F, no hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized steel cartridges protect Priming Fuel from water and dirt.

For More Information or the name of your nearest distributor, write or call any of the companies listed.

STANDARD OIL COMPANY OF TEXAS, El Paso  
THE CALIFORNIA COMPANY, Denver 1, Colorado



## Outstanding Tug in a Modern Fleet



Designed by Phil Brinck, Seattle  
Built by Gunderson Brothers  
Engineering Corp., Portland

### "Western Star"... first for low-cost operation!

#### "Star" performer on the Columbia —powered by ENTERPRISE

The 800 HP Enterprise DMG-38 Engine is Turbocharged to increase horsepower at any engine speed for greater operating economy.



*Western Star*—newest tug in Western Transportation Company's Portland fleet of 12 tugs, is already a "star performer—getting the toughest assignments and handling them beautifully," according to Mr. Leonard M. Thompson, president.

"Powered with an 800 HP Enterprise Diesel, the *Western Star* makes 3 round trips per week on the Columbia River," says Mr. Thompson. "Its towload 96 miles upstream against strong currents is the equivalent of 200 motor truck loads of logs. It handles the tow exceptionally well, and there has been a minimum of downtime. We give a good deal of credit to our Enterprise Engine for helping the *Western Star* turn in an excellent record of low cost operation."

When you want workboat power for the toughest assignments, remember this: Enterprise makes the finest diesels money can buy. That's why they are first choice of power experts everywhere. Full information on models from 73 to 7703 HP promptly on request; or simply contact your nearest Enterprise Marine Diesel Engineer.



DEPENDABLE ENGINES

**ENTERPRISE**  
engine & machinery co.

Subsidiary of General Metals Corporation  
18th and Florida Streets, San Francisco 10, California

Boston • Chicago • Jacksonville • Kansas City • Los Angeles • Minneapolis  
New Orleans • New York • Pittsburgh • Seattle • St. Louis • Washington, D. C.



## The case of the unused wrench

**How know-how and Cities Service Oil pay  
off for Easton Utilities Commission**

Take five men with 111 years' experience in power plant operation . . . add Cities Service DC-300 Lube Oil . . . and you can retire the big overhaul wrench to the nearest rocking chair.

That's precisely what Easton Utilities Commission of Easton, Maryland has done!

Under the management of Supt. William Krumbine (41 yrs. experience) and his team of specialists, overhauls and maintenance problems have become a rarity.

Take the generator pictured above. Using Cities Service DC-300 Oil, they've had it operating 600 to 700 hours a month for over three years without losing a bearing or a piston . . . and without even changing oil! Oil is added, but never changed, thanks to its unusual stability and outstanding detergent-dispersant characteristics. Compression, fire pressure, and fuel economy are excellent.

If you're looking for a lube oil that can reduce friction, resist oxidation, and boost fuel economy, talk with a Cities Service Diesel Lubrication Engineer. Call the nearest office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



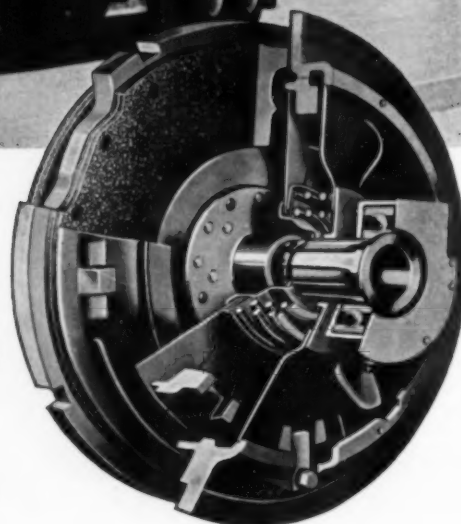
**111 YEARS' COMBINED EXPERIENCE** is shared by five men responsible for Easton's outstanding maintenance record. Sticklers for efficiency, they are unstinting in praise for Cities Service DC-300 Lube Oil.

**CITIES SERVICE**

QUALITY PETROLEUM PRODUCTS



## Pilot buys 110 new Diamond T's with trouble-free heavy-duty Spicer Clutches



Concentrating on giving its customers the best and most dependable service possible, Pilot Freight Carriers Inc. of Winston-Salem, N. C., insists that every consignment be routed, dispatched and shipped on time.

Naturally, dependability and maintenance-free service take top priority in the selection of equipment for the Pilot fleet. Explaining his choice of new equipment, T. D. Nicholas, Director of Operations for Pilot said this, "Our 110 new Diamond T diesels are virtually trouble-free. They're out on the road making money . . . not tied up in the shop. The Maintenance Superintendent tells me we've never owned trucks that were any easier to service." As you would expect, every one of these

110 new low-maintenance trucks is equipped with a Spicer 14" two-plate clutch.

Built to deliver 100,000 or more trouble-free miles, these Spicer clutches employ an anti-friction design that reduces pedal pressure at the same time it insures chatter-free operation in both forward or reverse. To insure longest wear, uniform pressure is maintained at all times by permanently parallel contact surfaces that resist cocking at any degree of wear. But best of all, pressure spring tension can be readjusted in minutes, by almost anyone, without the use of special tools.

For simplest maintenance and longest wear, do as Pilot does . . . specify Spicer Clutches for your fleet replacement program.

### DANA CORPORATION • Toledo 1, Ohio



#### DANA PRODUCTS Serve Many Fields:

**AUTOMOTIVE:** Transmissions, Universal Joints, Propeller Shafts, Axles, Power-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

**INDUSTRIAL VEHICLES AND EQUIPMENT:** Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

**AVIATION:** Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

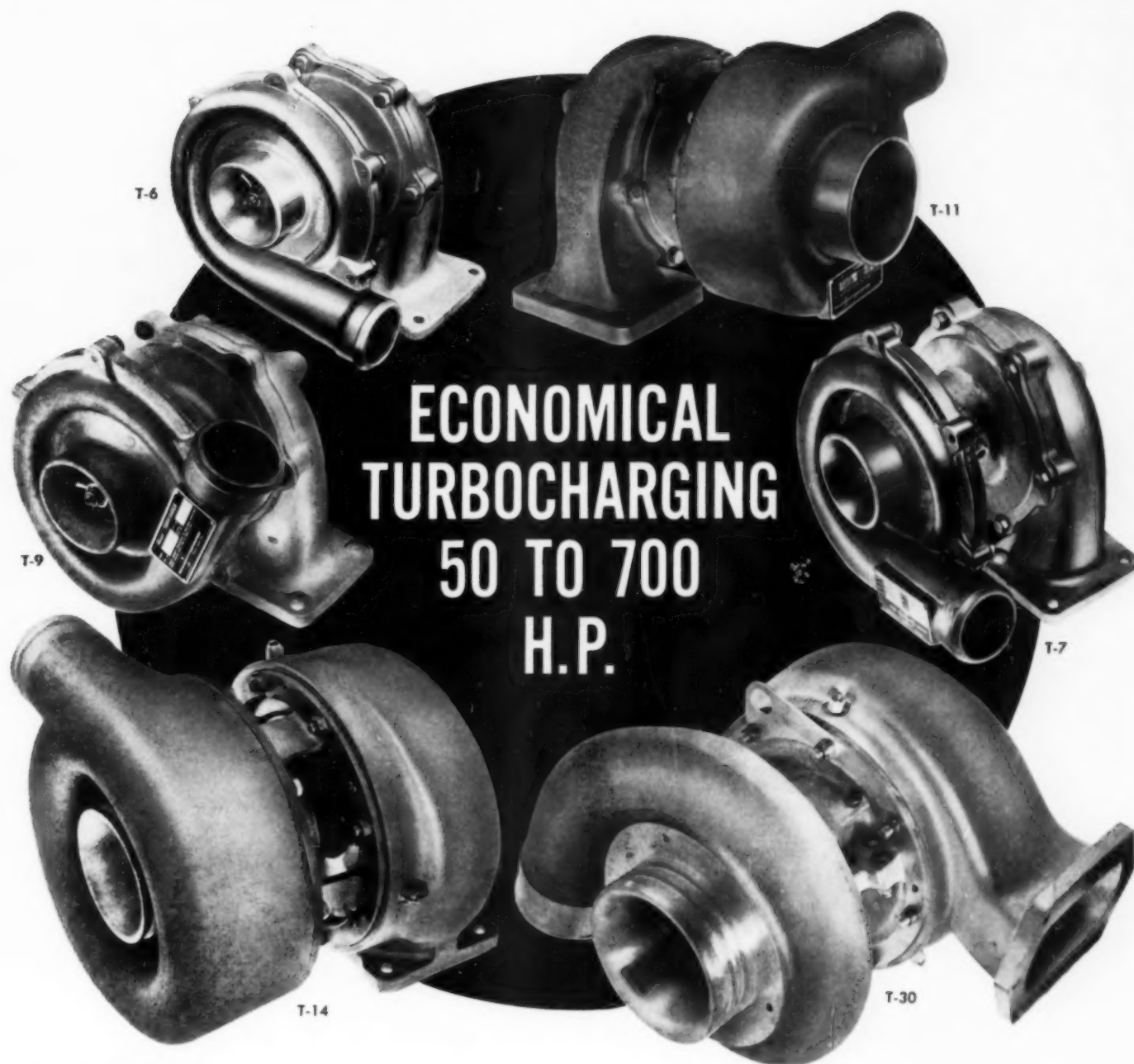
Many of these products manufactured in Canada by Hayes Steel Products Limited, Merrifton, Ontario.

**RAILROAD:** Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts, Traction Motor Drives, Forgings, Stampings.

**AGRICULTURE:** Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

**MARINE:** Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.





## ECONOMICAL TURBOCHARGING 50 TO 700 H.P.

**AIRESEARCH** now offers to the diesel engine manufacturer a complete line of turbochargers for automotive, stationary and marine engines covering the turbocharged range 50 to 700 horsepower for single installations. This family of improved turbochargers maintains excellent performance levels throughout the entire range of power, and allows greater ease of servicing through standardization and simplified design.

The reduced cost, light weight and high output of this turbocharger family enables the diesel industry to gain more horsepower per unit cost than has been possible before. They are especially effective in the low horsepower ranges where they make turbocharging of the smaller diesels economically practical for the first time. In addition, use of the AiResearch turbocharger control systems and intercoolers provides

the most effective turbocharging available by accurately controlling turbocharger speed over its complete range regardless of changing load characteristics.

AiResearch has sold more than 20,000 turbochargers, accounting for more than six million horsepower now in operation, and is the largest and most experienced manufacturer of lightweight turbomachinery of all types.

Your inquiries are invited.



**AiResearch Industrial Division**

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

JANUARY 1959

9

# Check engine wear!

GET LOW-COST MICRO-CLARITY  
OF FUEL AND LUBE OILS



FULFLO FILTER.  
New WG high capacity  
model with optional  
cover-lifting device.

**Full-Flow Filtration:** Fulflo Filters pioneered — and are still the leaders — in providing *full-flow* filtration of diesel fuel and lube oils.

**Depth Filtration:** Genuine Honeycomb Filter Tubes provide true *depth* filtration through precision controlled tunnels engineered for uniformity of size, shape, depth and density. You get the advantages of both absorptive and adsorptive filtration with Honeycomb Filter Tubes.

**Surface Filtration:** Flo-Pac resin-impregnated paper cartridges contain more than 6300 square inches of filtering surface *per cartridge*. Two cartridges are available — to retain 98% of all particles down to 5 microns in one pass, or down to 20 microns in one pass.

**By-Pass Filtration:** Honan-Crane and Michiana models have proved their efficiency in thousands of installations.

**Solid or Dissolved Contaminants:** Cranite (fuller's earth) removes products of oxidation *plus* solid contaminants; inert media is available to filter out solid particles only.

For complete literature,  
write to Department DS

**COMMERCIAL FILTERS CORPORATION**

MELROSE 76, MASSACHUSETTS

PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

**MICRO-CLARITY AT MINIMUM COST**



with genuine Honeycomb Filter  
Tubes for controlled micro-  
clarity of industrial fluids.



Selective filtration of oils • water-oil  
separators • magnetic separators •  
pre-coat filters • coolant clarifiers •  
automatic tubular conveyors.



Two of the three 175-ft. legs of mobile tripod-type platform with two-well derrick at right. The legs can be raised or lowered one foot per minute. Circular deck on top of leg at left is for helicopter landings.

## NOW BENDIX FUEL INJECTION HELPS DRILL TO 25,000 FT. IN 100 FT. OF WATER

A new mobile offshore drilling platform, the "Julie Ann", combines the desirable features of both mechanical and electric drill rigs. It is powered by three 834 HP, 900 rpm White Superior diesels equipped with Bendix Fuel Injection.

The especially-designed power package, located on the main machinery deck, was built by the Diesel Engine Division of The White Motor Company, whose engines are noted for smooth powerful performance with quick response to load.

Constructed by R. G. LeTourneau, Incorporated, the "Julie Ann" is owned

and operated by Dixilyn Drilling Corporation of Odessa, Texas—one of the foremost offshore drilling concerns. The platform is designed to drill six holes in a single location to depths of over 25,000 ft. while operating in over 100 ft. of water.

The ability of Bendix\* Fuel Injection to meet the highest standards of unusual as well as conventional applications is another reason why more diesel engine manufacturers are specifying Bendix than ever before in history.

\*REG. U. S. PAT. OFF.

Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.



One of three White Superior diesels equipped with Bendix Fuel Injection. This engine provides mechanical drive for a main mud pump and electric power for motors driving draw-works and independent mud pump.



Scintilla Division  
Sidney, New York





## New Issue of Transmission Topics

Fuller Manufacturing Co., has released Volume 7, Number 4, of Transmission Topics magazine. Featured in this issue is an editorial by E. L. Ludvigsen, president of Fuller, explaining the mutual benefits expected from Fuller's merger with Eaton Manufacturing Company,

Cleveland, Ohio. Seven concrete reasons for economic confidence are outlined in another editorial, while a third deals with the growth of Fuller service information through the past 36 years. Commercial freight carriers featured in the issue include: Yellow Transit Freight Lines, Inc.; Holland Motor Express, Inc.; Duff Truck Line, Inc.; and Kingsway Transports Ltd. In addition, Trans-

mission Topics reports on the preventive maintenance program of Lucky Stores, Inc. Developments and innovations among manufacturers are also covered in the latest issue. One story concerns KW-Dart's new plant in Kansas City, Mo. Two new truck models, the Brockway "Huskie" and the lightweight Autocar "A" series, are featured, while another report covers products of the

Crown Coach Corp. A copy of the new Transmission Topics may be obtained by writing to the Fuller Mfg. Co., Transmission Division, Kalamazoo, Mich.

## Bristol Bulletin on Special Charts

The Bristol Co. has released a new Bulletin, No. Y1906, describing charts for special requirements (including pre-printed photo charts for oscillographic recording). Engineering information and chart samples are included. Manufacturers or users of special instruments may obtain Bulletin Y1906 by writing to The Bristol Co., Waterbury 20, Conn.

ITS NEW

## New Allis-Chalmers Speed Reducer

Introduction of the new Shaftex shaft-mounted speed reducer in sizes up to 40 hp and with nominal internal gear ratios of 5 to 1, 15 to 1, and 20 to 1 has been announced by Allis-Chalmers. A completely enclosed unit for direct mounting on the driven shaft, the Shaftex reducer is available in single and double reduction units. It can be easily adapted without disassembly to include back stops where reverse rotation is prohibited and overload releases for chokable conditions. The Shaftex reducer is usually driven by a fixed pitch diameter Texrope drive. Variable speeds can be obtained by using either stationary control or motion control Vari-Pitch sheaves. For a higher degree of positive ratio transmission, the Shaftex reducer can be operated with a Timetex timing belt drive. The Shaftex reducer's flexibility and simplicity results in substantial savings in space and weight. Construction and operating features of the Shaftex speed reducer are described in a new bulletin, 20B9053, copies of which are available on request from Allis-Chalmers, Milwaukee 1, Wis.

ITS NEW

## Condensed Twin Disc Specifications

Twin Disc Clutch Co. has announced publication of a new, two color brochure which in 20 pages sets forth the Company's complete line of friction and fluid drives in condensed specification form. The attractive booklet, designated Bulletin 314, is fully illustrated with dimensional drawings, schematic cross sections, product views, etc. and pertinent specifications and dimensional data is presented on each model clutch, power take-off, reduction gear, coupling and torque converter. Copies of the new Bulletin 314 are available free upon request to Twin Disc Clutch Co., Racine, Wis.

ITS NEW



... and the starting is rugged!

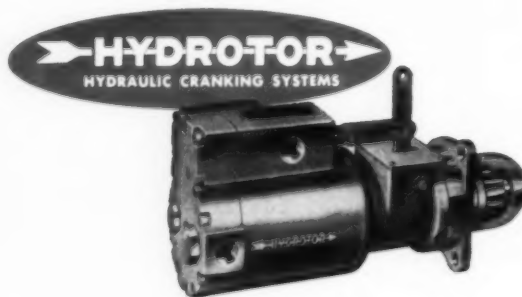
Expensive, too. When freezing weather strikes, countless man hours, machine hours and profits may be squandered before your equipment gets going.

BUT... for a fraction of the money you're now losing on cold weather starting, you can equip your engines with **AMERICAN BOSCH** Hydrotor hydraulic cranking systems that spin engines lightning fast even in sub-zero weather. The minute the day's work starts — every piece of equipment can be running and ready for action — with Hydrotor.

Hydrotor cranking power is always available—even after months of idleness. And for major savings... Hydrotor systems operate without batteries to spare you the incessant expenses of battery maintenance and replacement.

Learn more about Hydrotor—the revolutionary system that uses oil under pressure to crank engines faster with greater power. Send today for free brochure H 110-02-2

and the name of your nearest Hydrotor distributor. **AMERICAN BOSCH** Division, American Bosch Arma Corporation, Springfield, Massachusetts.



For construction, trucking, marine, logging, oil field equipment

6427

**AMERICAN BOSCH ARMA CORPORATION**

## Southwest Diesel

### Notes

By Don Taylor

COASTWISE tug, Frank E. Bauer has a new 600 hp Cummins diesel VT-12-M. Owner of the tug is Bauer-Smith Dredging Co. of Point Comfort, Tex. The sale by Cummins Sales & Service, Inc. of Ft. Worth.

THE WESTERN Co. of Odessa, Tex. purchased a new 600 hp Cummins diesel VT-12-BI to use in fracturing oil wells. This is a process of breaking and cracking the underground oil-producing rock by pumping oil or water back into the well under extreme pressures. Sale by Cummins Sales & Service, Inc.

OYSTER dredge has new power. Mateo Taliancich of Triumph, La. installed a 115 hp Cummins diesel, model HRC-4-M in the dredge in Duet Shipyard. Cummins Sales & Service, Inc. of Ft. Worth made the sale.

COUNT 'EM! Stewart & Stevenson Services, Inc. of Houston, Texas sold 54 generator sets to the U. S. Marine Corps. The 20 kw units are powered by 2-71 GMC diesel engines.

TO CARDWELL Manufacturing Co. of Wichita, Kan. goes a Stewart & Stevenson model RD 20 rig lighting unit powered by a 2-71 GMC diesel engine.

FOR MISSILES. Commerce Electric Supply Co. of Farmington, Mich. purchased two Stewart & Stevenson model 28300 generator sets. The units will be used in the missile program.

PHILLIPS Petroleum Co. bought a 30 kw generator set for its British Honduras operation. Power for the unit—a General Motors diesel. The sale was made by Stewart & Stevenson Services, Inc. of Houston, Texas.

NORVELL-Wilder Co. of Houston bought GM diesel quads to power an Emsco oilfield pump. Sale by Stewart & Stevenson Services, Inc.

IDECO—a Dresser Industries subsidiary of Beaumont, Texas—bought a GM 6082 torque converter engine from Stewart & Stevenson Services, Inc. of Houston. Ideco is one of the largest manufacturers of oilfield rigs.

JACOBO Selem, Brownsville, Tex. will power a fishing boat with a General Motors 62206 marine engine. Sale by Stewart & Stevenson Services, Inc.

GRAYBAR Electric Co. of Little Rock, Ark. purchased a 110 GM 165 C gen-

erator set. Capacity is 250 kw. Sale by Stewart & Stevenson Services, Inc., Houston.

NEW POWER for a freightliner truck. G. C. McBride Co., Brownwood, Tex. repowered a White truck with a NHB-600 Cummins diesel rated at 200 hp. Sale by Cummins Sales & Service, Inc., Abilene, Texas.

MINING Industry—A 320 hp Cummins diesel engine, model NHRS-6-BI is now busy in the mining industry in South Texas. The Uvalde Rock Asphalt Co. of Blewett, Tex. bought the engine from Cummins Sales & Service, Inc., Ft. Worth.

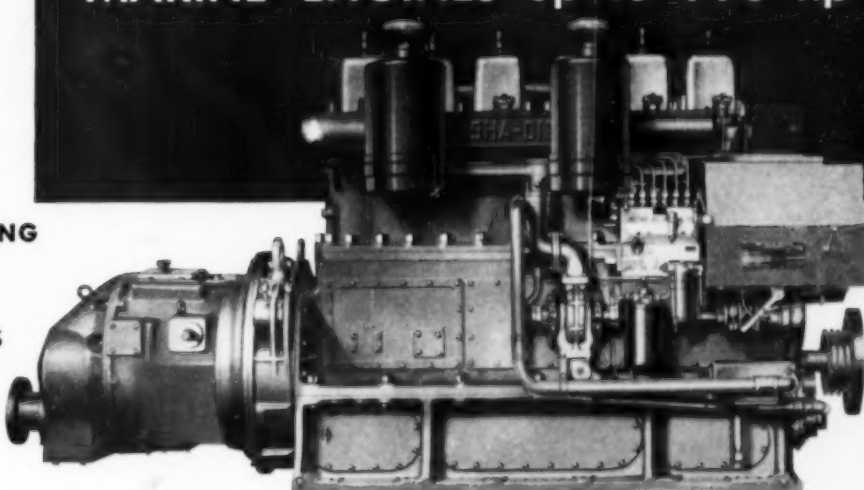
HUMBLE Oil & Refining Co., Freer, Tex. has repowered an Oshkosh truck,

model W-1500-CD with a 175 hp Cummins HR-6-B diesel. Cummins Sales & Service, Inc. of Ft. Worth made the sale.

NEW POWER for a Euclid 48 DT 9. Uvalde Rock Asphalt Co. Blewett, Tex. installed a 220 hp Cummins diesel, model NH-220 in the carrier. Sale by Cummins Sales & Service, Inc., Ft. Worth.

# WAUKESHA Diesel

## MARINE ENGINES up to 990 hp



- EASY STARTING
- SAFETY
- SIMPLICITY
- SMOOTHNESS
- ECONOMY

**DEFENDER (LRD Series) 2894 cu. in. Normal or Turbocharged DIESEL**



A Waukesha DEFENDER Marine Diesel repowers the 73-ft. dragger RUSH

386-R

<b>WAUKESHA MOTOR COMPANY</b> <b>WAUKESHA WISCONSIN</b> <b>NEW YORK</b> <b>TULSA</b> <b>LOS ANGELES</b> <i>Write for detailed descriptive bulletins</i>	Engine Model	Engine Type	No. Cyls.	Bore and Stroke	Displ. Cu. In.	MAXIMUM RATING 24-Hour Duty
	RELiance	Normal	12	8½ x 8½	5788	665 horsepower @ 1215 rpm
		Turbo	12	8½ x 8½	5788	990 horsepower @ 1215 rpm
	DEFENDER	Normal	6	8½ x 8½	2894	335 horsepower @ 1215 rpm
		Turbo	6	8½ x 8½	2894	510 horsepower @ 1215 rpm
	WANDERER	Normal	6	7 x 8¼	1905	240 horsepower @ 1215 rpm
		Turbo	6	7 x 8¼	1905	315 horsepower @ 1215 rpm
	RESOLUTE	Normal	6	6¼ x 6½	1197	195 horsepower @ 1600 rpm
		Turbo	6	6¼ x 6½	1197	290 horsepower @ 1600 rpm
	VIGILANT	Normal	6	5¼ x 6	779	150 horsepower @ 1800 rpm
		Turbo	6	5¼ x 6	779	195 horsepower @ 1800 rpm
	CUTWATER	Normal	6	4¼ x 5	426	100 horsepower @ 2000 rpm
		Turbo	6	4¼ x 5	426	120 horsepower @ 2000 rpm



## Mid-West Diesel News

By L. H. Houck

CUMMINS MH-220 to Central Teaming Co., Chicago, for repowering a Mack LJSW; an MH-220 to Karlin Cartage Co., Chicago, to repower a Diamond T 921 R, both from Cummins Ill. Engines, Inc., Chicago.

DEUTZ A8L diesel 614, crude oil burning, air-cooled diesel V-8 replaces an electric motor for Wood Oil Co., Tulsa, on its Eureka, Kan., project injecting water in an oil well water-flooding operation. Use of crude for fuel obtained from the wells is more economical than either electric or diesel fuel. Deutz U. S. importer is Diesel Energy Corp., 82 Beaver St., New York.

TWELVE International DCOF-405 tractors, with Cummins diesels and 12-speed synchronized transmissions to Navajo Freight Lines, Denver.

FOUR Mining Co., Caulfield, Mo., an Allis-Chalmers HD11E with dozer from Chiles, Springfield, Mo.

ST. CHARLES Hauling Co., St. Charles,

Mo., an International TD-9 with Drott loader from Mo.-Ill. Tractor Co., St. Louis.

GALION 104 grader powered with a UD-14 International diesel to Pulaski County Highway District, Mound City, Ill., from Mo.-Ill. Tractor Co. St. Louis.

PITTSBURGH Railways Co., Pittsburgh, Pa., has purchased fourteen 45-passenger Mack busses, with Mack transmissions and diesels.

RINGSBY Truck Lines, Denver, 10 Internationals, 14 White Freightliners, 18 Model K-522 Kenworths, and 71 Peterbils, all COE's with standardized components which include Cummins diesels, Fuller transmissions, Timken driving axles, Westinghouse brakes. Thirty-one of the Peterbils have four-axle chassis with two steering axles.

EAST Texas Motor Freight, Dallas, included 175 White tractors with Cummins NH-180 diesels in its \$5,000,000 expansion program.

TO GRANT Bowles, Keokuk, Ia., an International TD-18 tractor with dozer from Mo.-Ill. Tractor Co., St. Louis.

M. & S. Mining Co., producers of feldspar, Salida, Colo., recently placed a Gardner-Denver 600 air compressor in service. Power is GM-6-71.

OLIVER OC-12 with Hercules diesel to Moline Excavating Co., St. Louis, from Koste Machinery Co.

FRIENDSHIP Milling Co., Friendship, Ind., a Cummins HRC-4-IP to operate a flour mill, from Cummins Diesel of Indiana, Inc.

INTERNATIONAL TD-9 with Drott 4-in-1 bucket to Russell Sohn, Cape Girardeau, Mo., from Mo.-Ill. Tractor Co., St. Louis.

CUMMINS NH-220 to C. J. Austed & Son, Hethinger, N. D., for repowering a Mack B-73-S, from Cummins Diesel Sales, Inc., Minot, N. D.

TWO TD-20 Internationals with dozers to Hellibusch Bros., Washington, Mo., from Mo.-Ill. Tractor Co., St. Louis.

J. & S. SEWER Construction Co., Overland, Mo. has taken delivery on an International TD-14 with Drott from Mo.-Ill. Tractor Co., St. Louis.

A CUMMINS NH-220 to Star Transfer, Billings, Mont., for repowering a White Freightliner WF-64, makes the 28th Cummins diesel in the fleet. Engines were supplied by Cummins Diesel Sales of Montana, Inc.

# Better Injectors ... Lower Cost ...

NEW KENT-MOORE SERVICE EQUIPMENT SPEEDS OVERHAUL AND REPAIR OF GM DETROIT DIESEL INJECTORS



**GM Detroit Diesel Injector Comparator Tests performance under simulated operating conditions.** Eliminates all guess-work in overhauling and rebuilding injectors to factory specifications. When used with Injector Tester, the condition of all operating parts can be determined. Unnecessary replacement of parts eliminated. With Kent-Moore's J 7041 Diesel Injector Comparator you "road test" GM Injectors right in your shop!

Developed in cooperation with the engine manufacturer, the K-M Injector Comparator measures actual output of new, used or rebuilt injectors by testing them at a fixed speed at a specified number of strokes with filtered fuel supplied at uniform service pressure.

### HANDLES ALL SERIES 71 AND 110 INJECTORS

Now you can scientifically test new or rebuilt injectors before building them into the engine—and you can even match-up sets of GM injectors with uniform delivery rates for the best engine performance!

**SEND FOR BULLETIN**—Write for full data on these and other Kent-Moore special service tools and equipment.

Trade in your old injector tester! K-M Testers purchased within the last three years are worth \$75.00 to you! Older models or any make of pump-type testers, bring \$25.00 trade-in allowance.



**KENT-MOORE ORGANIZATION, INC.**

28635 MOUND ROAD, WARREN, MICHIGAN

58-F-6

ENGINEERS AND MANUFACTURERS OF SERVICE TOOLS AND EQUIPMENT

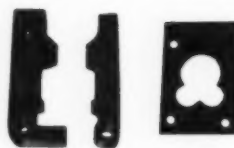


**INJECTOR TESTER FOR POPPING, SPRAY PATTERN, HIGH AND LOW, AND PRESSURE LEAKS.** The redesigned J 7509 Injector Tester used rigid steel tubing to closely regulate the circuit's volume of fluid. Microfilters eliminate dirt, the greatest single element of injector trouble, and a special cam-operated clamp supplies just the exact amount of pressure for perfect sealing during test. The J 7509 Tester will handle both standard body and offset body Series 71 injectors.

**ADAPTER KITS.** The J 7510 adapter kit is composed of a quick-clamp and support plate designed specifically for standard body Series 110 Injectors. For the offset body Series 110 Injectors, the J 7511 Adapter Kit is used. These parts are installed on the J 7509 Injector Tester in place of the Series 71 unit.



**INJECTOR ASSEMBLY FIXTURE.** The J 6868 Injector Assembly Fixture provides a quick-clamp fixture to retain the Series 71 Injectors for repair or re-assembly. Jaws are available to fit all Detroit Diesel Injectors.



**JAWS AND SUPPORT ASSEMBLIES.** Jaws and support assemblies are available to adapt the J 6868 Injector Assembly Fixture to handle all the Detroit Diesel Injectors. J 7505 Standard body Series 110, J 7784 Offset body Series 110, J 7506 All Series 51.



## Chicago Pneumatic Names Stewart & Stevenson

Stewart & Stevenson Services has been named a distributor for the industrial and oil field industries of Chicago Pneumatic engines, Joe Manning, Stewart & Stevenson vice president and general manager, announced recently. Stewart & Stevenson Services, one of the world's largest distributor of diesel engines, will handle the complete line of Chicago Pneumatic engines. The engines will be available in sizes up to 2000 hp. "This line of larger capacity engines further compliments the Stewart & Stevenson line of General Motors diesel and Chrysler industrial and marine engines," Manning said. Of interest to industrial and oil field engines buyers will be two new models of C-P engines. They are particularly adaptable for heavy-duty, high horsepower oil field and industrial applications. The two new models feature a low weight to horsepower ratio and are available either as full diesel engines, dual fuel, gas/diesel or spark ignited straight natural gas engines. Parts and services will be available from all Stewart & Stevenson branches, dealers and distributors located throughout the Southwest.

## Fan-Cooled Worm Gear

Convenient mounting for top, bottom, vertical, side-wall or angled drive of durable Verso worm gear speed reducers is described in a new bulletin published by De Laval Steam Turbine Co. Complete horsepower and torque data for Verso worm gear units built on 2½ up to 4 in. centers are given in full-page tables. Speed reduction ratios ranging from 70:1 to 5:1 are available for heavy-duty industrial applications where continuous running under demanding service is required. Dimensions of the versatile worm gear units in various sizes are diagrammed and tabulated in detail. Materials and design of the interchangeable components are also described. The compact speed reducers employ aluminum fans to cool the easy-to-mount cast-iron casing. Copies of the Bulletin 5018 on Verso Worm Gear Speed Reducer may be obtained by writing to De Laval Steam Turbine Co., Trenton 2, N. J.

(ITS NEW)

## Cummins Arizona Names Neal

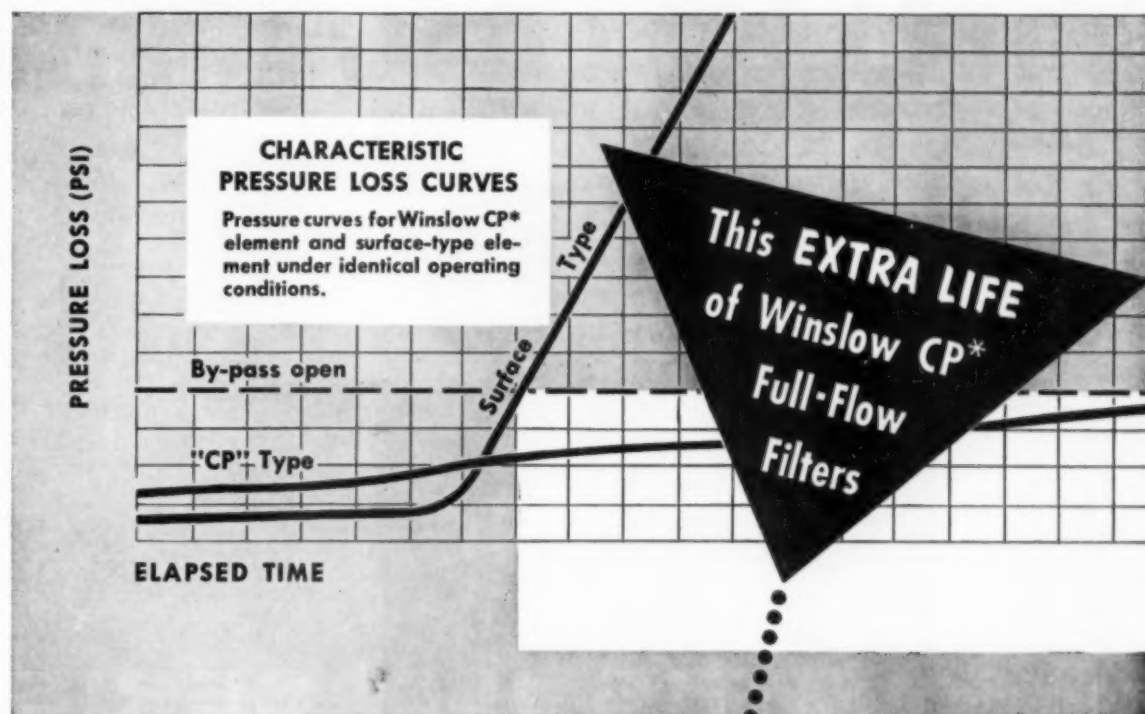
Mr. J. R. (Jim) Neal has been appointed vice president and general manager of Cummins Arizona Diesel, Inc., according to Paul O. Miller, president of the state wide distributor of Cummins diesel engines in Arizona. Mr. Neal has been general manager of Cummins Service & Sales, Southern California distributor of Cummins products, for the past 13 years. He is a U. S. Navy veteran and

prior to the war was with Euclid Road Machinery Co. (Forerunner of Euclid Division of General Motors Corp.) in Cleveland, Ohio, where he was born and attended school.

## Turbocharger Kit Distributor

Appointment of J. T. Jenkins Co. of Los Angeles as distributor for AiResearch turbocharger kits has been announced by The Garrett Corporation's AiResearch Industrial Division. Sales, service and installation of AiResearch model T1419 turbocharger kits on Cummins NH series diesel engines will be handled by Jenkins through a territory that includes the states of Washington, Oregon, California, Arizona, New Mexico, Texas, Utah, Nevada, Idaho, Mon-

tana, Colorado and Wyoming. The distributor is a well established organization long associated with western trucking activities. Though initially concerned with highway installations, Jenkins will also aim for installations on "off-the-road" construction equipment. Jenkins' distributor headquarters are maintained at 2757 Leonis Boulevard, Los Angeles 58.

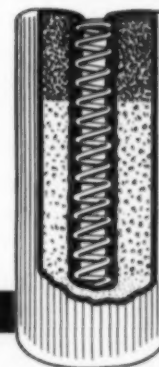


## Saves both the Oil and the Engine

Laboratory tests and operating experience indicate that Winslow CP\* filters have as much as 50% more useful life than a surface-type filter. As a result, both the lube oil and the engine are protected beyond normal filter service.

Contractors, for instance, report that useful oil life in diesel-powered equipment has been extended from 80 hours to 300 hours, with Winslow CP\* filters.

Most important, engines are protected all the time with Winslow full-flow filtration... protected during cold starts, while idling and against excessive dirt... protected if a bearing fails. Because of this better oil filtration, engines last longer and require less maintenance. A modest investment in Winslow filters returns substantial dividends.



### THE CP\* PRINCIPLE

Winslow patented CP\* (Controlled Pressure) elements are designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil from the filter without opening by-pass valves. This is accomplished through the dual flow capacity, with two types of material, as illustrated.

# WINSLOW FILTERS

\*CP is fully protected by patents and trademarks

Winslow Engineering and Manufacturing Co.

4669 Hollis Street • Oakland 8, California

# NEW

## AIR-COOLED DIESEL ENGINES now available through **HERCULES**



JLO-325



JLO-660

## THE JLO\* SERIES

(pronounced "ee-lo")

Distributed in the United States by Hercules Motors Corp.

\*Reg. TM of Jlo-Werke, G.m.b.H., Pinneberg, Germany

### Check these outstanding features:

- **SIMPLICITY:** Jlo Series diesel engines are of 2-cycle design: eliminate valves, tappets, push-rods and camshaft for dependable, maintenance-free operation in their horsepower range.
- **ECONOMY:** Initial economy is coupled with maintenance economy since simplified Jlo Series design eliminates the problems of valve adjustments, and reduces cost of overhaul.
- **LIGHTWEIGHT:** 2-cycle simplicity and judicious use of aluminum in construction reduce the weight of Jlo Series diesel engines to less than 15 pounds per horsepower!
- **PERFORMANCE-PROVED:** Jlo Series air-cooled diesel engines have been used in every climate for every service in their power range. Fast-starting and rugged, they are ideal for both "stand-by" and continuous-duty operation.

FOR MORE INFORMATION  
send for illustrated booklet



## HERCULES

HERCULES MOTORS CORPORATION  
Canton, Ohio

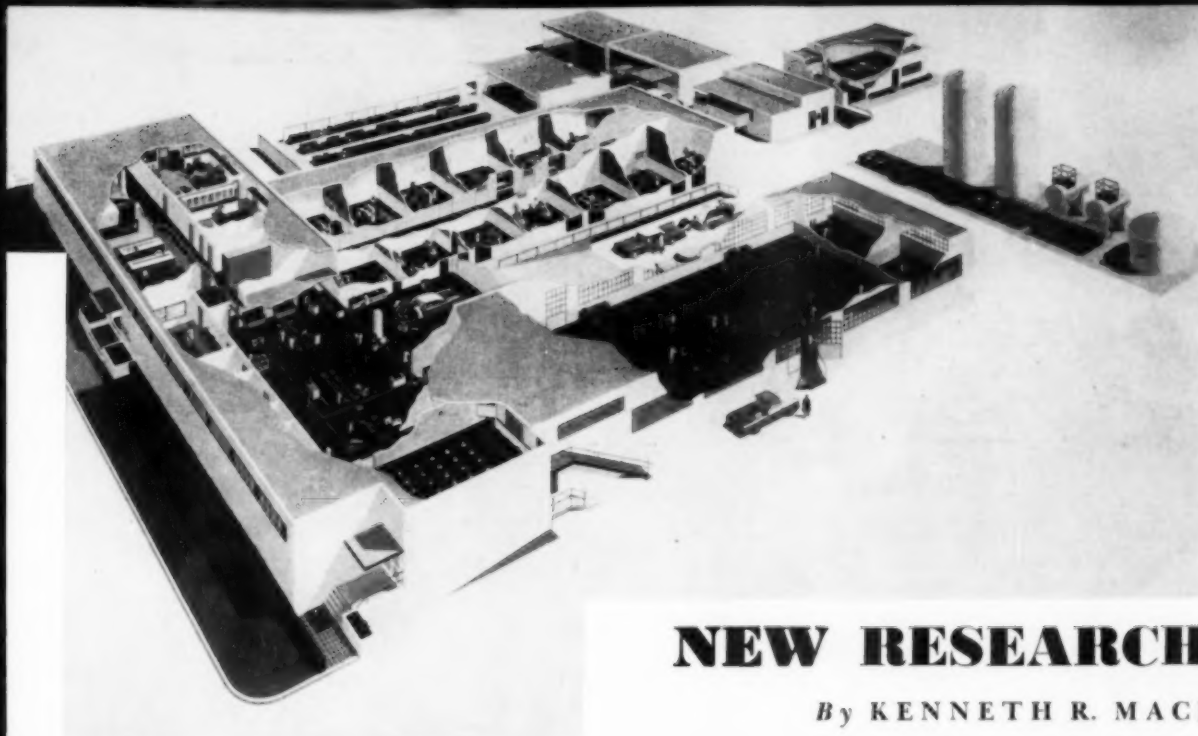
HERCULES ENGINES . . . Sold and Serviced the World Over

#### HERCULES MOTORS CORP.

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Please send me more information on JLO Series air-cooled diesels and the name of my Hercules distributor.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



Layout of huge new testing laboratory at Richmond, Calif., maintained by California Research Corp., a subsidiary of Standard Oil Co. of Calif.

## NEW RESEARCH CENTER

By KENNETH R. MACDONALD

**A** COMPARATIVELY little known subsidiary of a widely known leader of the nation's petroleum industry is now hard at work developing research programs which may save untold sums for users of diesel engines. The subsidiary—California Research Corp.—is the research arm of the huge Standard Oil Company of California and is now centered in a \$3,000,000 two acre research headquarters at Richmond, Calif. In 14 highly complex research cells located in the main building of the new engine laboratory at the Richmond center, skilled engineers are now engaged in a great variety of laboratory programs which certainly will effect the development and performance of diesel fuels and may even have future effect on the design of diesel equipment. A visitor to the engine laboratory, looking through the heavy glass of an observation window, would see huge engines inside the test cell quivering with acceleration, or slowing to idling speed, without a sound coming from the inner chamber. The walls are soundproof, but the visitor could see changes of speed, manifold pressure, fuel consumption and power output . . . all on an instrument panel outside the various cells. The panel contains control throttles, of course, but the operator seldom if ever touches them. Alongside the engine, inside the cell room, is an electronic driving machine attached to the throttle to automatically and ex-

actly reproduce the stop, starting, racing or idling sequence in any of a dozen types of traffic situation. Attached to the drive shaft of the engine, whether it be a huge truck diesel or a radial airplane engine, there is a dynamometer which loads it with the exact pulling weight required. Only thing missing is the driver's blood pressure!

Research engineers watch for the deposits made by different fuels, with different additives, on the rings, pistons and combustion chambers. They watch for wear and corrosion; for knock or ping and they can keep a test engine in traffic for weeks. Every cell is used to test for a different result. The truck diesel, for example, endlessly hauls a heavy load up a steep hill. The exhaust stack may be cluttered with measuring instruments testing heavy diesel fuels for smoke abatement. One whole wing of the main building is a vast room filled with mounted engines evaluating lubricating oils. On many of the stands in this section, warning signs indicate the test engine has one or more parts that have been made radioactive. This is so that a Geiger counter can pick up the most microscopic particles of worn-off metal in the oil; and give an exact measure of the wear-preventive qualities of the oil being used. A ramp leads to a fully equipped shop where every part, transmission, differential, wheel bearing, engine, etc., can be

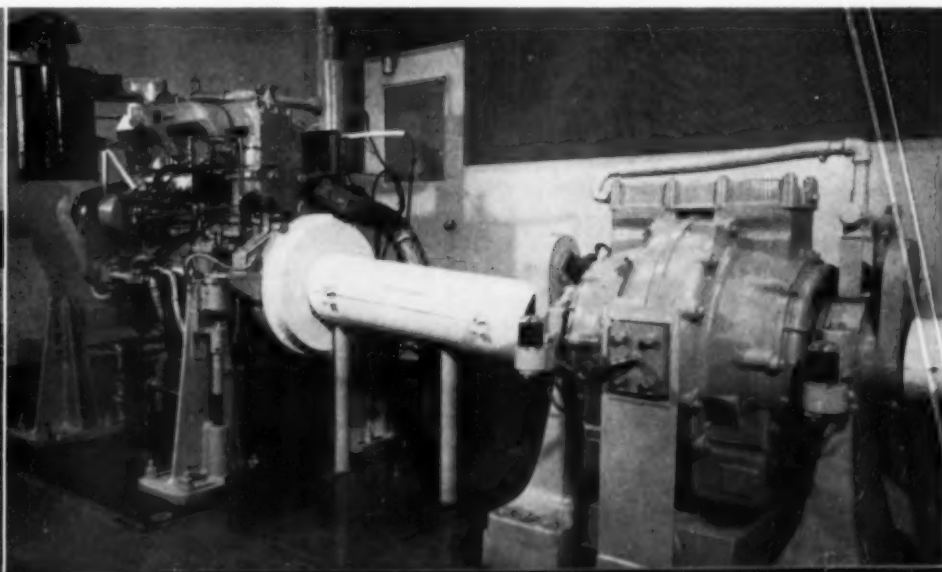
stripped down to its last bolt, tested, measured, rebuilt and be put back on the road. Runs are conducted and measured for months on whole fleets of trucks, diesel locomotives, etc., while in actual operation for an outside owner.

Another wing of the building contains seven individual lubricant and grease testing laboratories, as well as a central laboratory room with larger research equipment. In these laboratories, wheel bearing greases are given heavy loads, gear grease is subjected to grinding stresses, lubricants for huge diesel powered earth movers are put to work under the layers of dirt they will encounter in actual use. The biggest single testing unit has a whole building of its own to house the chassis dynamometer. The great doors can swallow an entire truck and inside it is mounted on a grated floor, its rear wheels resting on and driving 5 ft. metal drums whose sides reach just to floor level. As the rear wheels turn the drums, gentle hills, down slopes or steep grades are simulated by an electrically controlled power absorber. As the speed increases, louvers open and wind whips by the engine at the same speed it supposedly is being driven. To simulate summer in the desert, the temperature rises to 120 degree F. Dust appears on command. Or humidity, freezing cold, rain or ice.

A Kenworth tractor is placed on the dynamometer for testing under extreme heat conditions.

Cummins engine driving dynamometer in test cell during research on diesel fuels.

17







A Mack diesel tractor with low-boy trailer moves one complete 2000 kw generator unit into position. All work was contracted to obtain realistic installation costs.

In appearance as well as in efficiency the four unit, 6000 kw Electro-Motive MU 60 plant would be an asset to a utility company.

## 6000 KW UTILITY PEAKING PLANT

By ROBERT E. SCHULZ

**L**AGRANGE, Ill., Nov. 4, 1958—In its suburban Chicago Plant today, the Electro-Motive Division of General Motors put on demonstration test a proto-type of a packaged power plant conceived and built for widespread application in the utility industry. Completely designed for remote-automatic operation, the new plant, designated MU 60, consists of three individually housed generator units, each with a nominal rating of 2000 kw and one electrical control station. One output bus connection is used and only one input signal is required. Each unit of the plant is base mounted with a weather-protective and sound insulated enclosure and is designed for ease of transportability and installation. The plant has a capability of producing full load output within 90 seconds. This certainly is on the far side since in test today the plant came on the line with full capacity in 47 seconds. Perhaps even more remarkable is the fact that this complete 6000 kw package has been placed on the market at a price of \$100/kw including an estimated installation cost of \$15/kw.

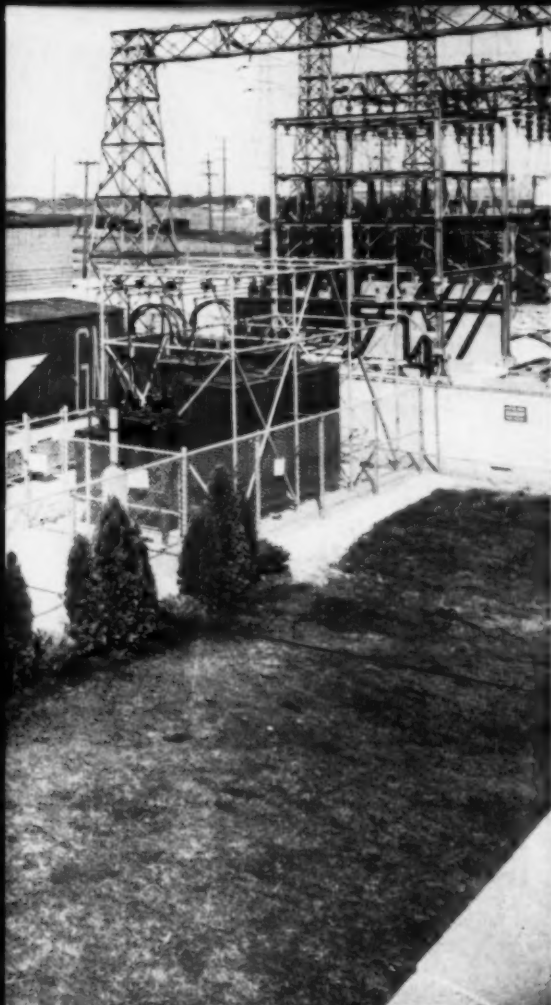
Conception of this power package has a substantial background and Electro-Motive sales and engineering personnel have maintained close contact with the utility industry throughout all stages of development beginning about 1954 when the company entered the public utilities supply business with

its 1000 kw mobile peaking and standby unit. In reviewing their limited success with this original plant, N. C. Dezendorf, General Motors vice president and general manager of the Electro-Motive Division pointed to two significant accomplishments. "The most significant," he stated, "is that we have been successful in focusing the attention of the thinking people of large utility operations, and particularly their planning departments, upon the need for specialized power for meeting these peaks. We have gotten a great many of the larger utility systems to undertake studies of their own to prove out the economics of this requirement. The next most significant accomplishment has been that we got several of the largest utilities, as a result of their studies which they made on their systems, to blueprint the specifications of the kind of peaking plant that they feel would be required to do the job if, as and when they embraced the concept of specialized power for this purpose."

Around the specifications set by the utilities, EMD designed the MU 60 plant. Basically they were: (1.) that it should have a minimum of 5000 kw; (2.) it should be portable and should be installed with a minimum of operating expense; (3.) it should be completely automatic in its operation and fully protected against weather, etc.; (4.) that it should be clean, quiet and presentable—a good

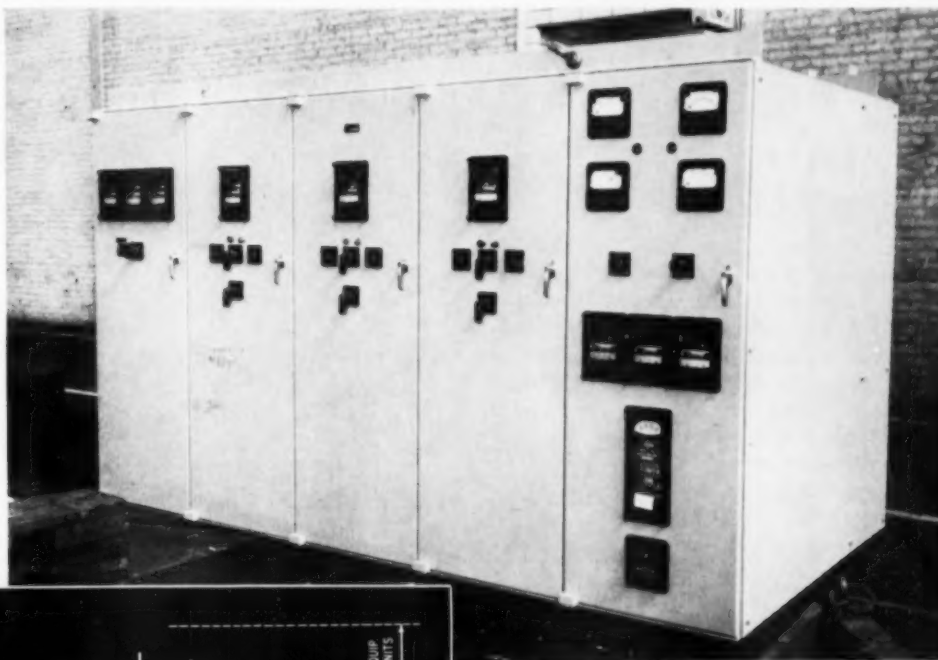
neighbor and (5.) most important, it should install for under a \$100/kw, as compared with the present scale of anywhere from \$150 to \$350/kw for a steam installation. It is evident that EMD has met or bettered these specifications.

EMD's sales program is based on the fact that the utility industry has been in a steady state of expansion since its birth. Mr. F. W. Walker, assistant general manager in charge of utility sales, in commenting on the above, stated, "The industry's growth is forecast at about 7 per cent per year on a cumulative basis. Capacity of this industry is now at about 140 billion kw and in the next 20 years, its growth is estimated at 300 billion kw." It has been firmly established that a large steam generating plant with units of 25,000 kw upwards, can produce kilowatt hours at lower cost than a diesel plant when the former is operating on base load with a high plant factor. Production costs for a steam plant, however, increase very rapidly as the load drops below 40 to 50 per cent and it becomes expensive and uneconomical to operate just for the peaks. This is the area that has been subject to extensive investigation by Electro-Motive and the economics of current and future utility power expansion definitely establishes a market for their MU 60 peaking and reserve plant. In summarizing the company's research work in this field,

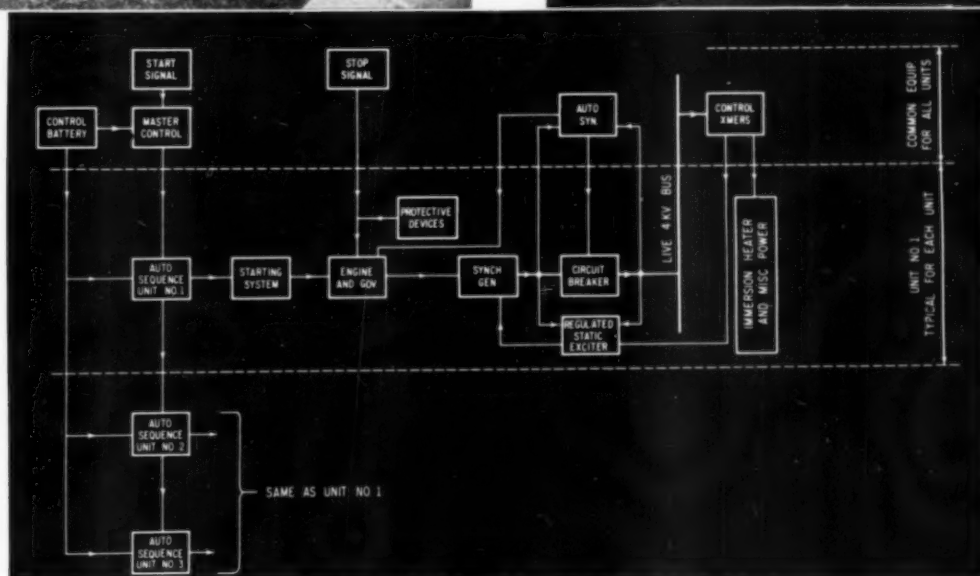


would be 30 million kilowatts in peaking power."

The MU 60 plant is truly a beautiful thing, not only from the standpoint of appearance, but also because of its compactness and simplicity of installation and operation. To demonstrate its remote-automatic operation, I was invited to stop and start the plant through means of a simple, two-button motor control. A press of the button started the coordinated sequence as each of the breakers opened, the engines came down to idle for two minutes, and then stopped completely.



Switchgear for the EMD MU 60 control unit prior to installation.



Block diagram of automatic control system.

Walker stated, "that by integrating low cost peaking power into the system steam plant, years of service at high low operation will be lengthened substantially. More kilowatt hours at high plant factor will be obtained from the high efficiency plants. Service will be provided for less capital requirement because of the low cost of the peaking power added, and lower over-all system production costs will be obtained." Mr. Dezendorf, when asked what per cent of future utility capacity could be handled by the MU 60's answered, "To be conservative, I think that over a period of years we're talking about something around 10 per cent of the capacity. Since the charted growth of the utilities in the next 20 years approximates 300 billion kilowatts, 10 per cent of this figure

After a brief interval the start button was pushed and each engine in sequence cranked over, came up to self-sustained firing speed and then full rpm. As each generator came into phase, the breakers locked and in 47 seconds the plant was on the line. A close examination of a generator unit shows that it consists of a 2000 kw synchronous generator with a regulated static type exciter, directly coupled to a 16-567D engine and the required supporting auxiliaries including oil coolers, filters, transfer pumps and radiator type heat exchanger. The 16-567D engine is the new turbo-charged version of Electro-Motive's standard 16 cylinder, two-cycle diesel and is rated 2855 bhp at 900 rpm. Development of this engine coincided directly with the EMD work on the MU 60. The

All electrical and fuel connections to the units are located at the bottom of each as are the interconnections between the unit and the control station. Main power connections are made directly to the synchronous generator terminals and no disconnects or terminal boards are required between the generator and the control station. The control station contains the equipment to start and control the generator units and the entire 6000 kw of 4160 volt, 3 phase, 60 cycle power output is delivered at a bus at the end of the control unit. The metering and instrumentation system is compact and supplies information on voltage, frequency, current, kilowatts, kilovars, kilowatt hours and synchronizing indicators. A system of switching allows common usage of all meters (except watt hour) to indicate either unit or total plant output. Three sets of switchgear incorporating a horizontal drawout 250 MVA air circuit breaker and a pull down type potential transformer are provided, one set for each generator. A magnetic amplifier type regulator with auxiliary controls regulates the voltage to permit operation of the power plant in parallel with the utility system. Surge capacitors and lightning arrestors are provided and the engines will shut down in the event of high cooling water temperature, low lube oil pressure, etc. An annunciator is provided to indicate the reason for shutdown.



# RANGER III GOES TO WORK

**New Million Dollar Ferry  
Powered By Twin 614 SHP  
Diesels Driving Controllable  
Pitch Propellers**

By ROBERT E. SCHULZ\*

**S**TURGEON Bay, Wisconsin—With its light blue and yellow trim glowing in the late afternoon sun, the *M/V Ranger III*, a luxurious 165 ft. passenger and freight ferry, left the docks of Christy Corp. here for delivery to Houghton, Mich. Three days later, on Sept. 27, the vessel was officially delivered and turned over to her owners, the National Park Service. The new *Ranger*, powered by twin 614 shp Kahlenberg diesels, was built by Christy at a cost of \$1,160,000 to provide better service to vacationists traveling between Houghton and Royal Isle National Park in Lake Superior. The trim vessel replaces the outmoded, wood hull, diesel powered *Ranger II* and in service has an average speed of over 15 mph which reduces the trip between the two points from seven to five hours. With a length of 165 ft., *Ranger III* has a 34 ft. beam and a draft of 10 ft. It has a displacement of about 800 tons and a passenger carrying capacity of 100 persons. Now in service, the *Ranger* is skippered by Captain C. R. Greenleaf with a crew of 11 including Chief Engineer J. A. Williamson. Crew size will be increased during the height of the tourist season when additional personnel information service, food service, stewardess and nursing duties will be added.

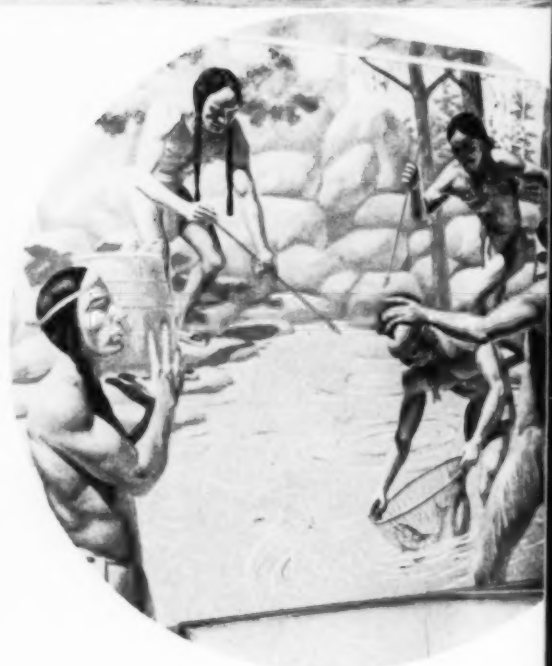
From bow to stern—engine room to funnel, this new ferry is "first class" as the pictures on these pages fully testify. Nothing was spared in accommodations and appointments and this is true in the machinery space as well. Propulsion power is supplied by two Kahlenberg model E-6 turbocharged, high-output, non-reversing diesels developing 614 shp each at 325 rpm. This is the first twin engine installation of this new two cycle, six cylinder, 10½ in. bore by 16 in. stroke Kahlenberg diesel and smooth performance in trials and delivery augurs well for success. Each engine drives a hydraulically operated model 60 KaMeWa three-bladed controllable pitch propeller, 76 in. in dia. with a working pitch of 61½ in. Propeller shaft is direct coupled to the engine and runs through the built-in Kahlenberg thrust bearing to the KaMeWa oil distribution box that hydraulically controls the propeller pitch. This engine-propeller combination makes it possible to obtain full engine power whatever the weather conditions, adds

\*Managing Editor, *Diesel Progress*

great maneuvering characteristics to the vessel and permits the engines to continually operate at greatest efficiency. All of this, of course, is made possible by the Woodward governor on each engine working in conjunction with the propeller controls to achieve close regulation of fuel supply. Propeller pitch is controlled remotely from the main stand in the bridge. Manual control is provided by an emergency stand in the engine room proper and slave units are positioned on the bridge wings for individual control. Aft of the main engines and Christy-built switchboard is the auxiliary engine room where ships service power is generated by two Caterpillar D 318 engines. Each drives a 60 kw, 75 kva, 3 phase, 60 cycle, 120/208 volt generator at 1800 rpm.

The engine room itself is functionally planned with ample operating space. The two Kahlenberg engines are positioned forward and amidships and direction of rotation is inboard. CAV fuel injection systems are used on both engines, as are Napier turbochargers. Starting air equipment, water and lube oil heat exchangers, and fuel and oil filters and pumps are compactly located to the side maintaining easy access to the both engines. Storage tanks for 3500 gals. of fuel oil are installed below the engine room. Provision is made for storage of 320 gals. of lubricating oil in the engine room aft. The four panel switchboard is installed amidships, aft of the main engines and control stand. Built solely by Christy, it has two panels left for all electrical controls and gauges. Panels to the right control the pumps, compressors, fans and propeller pumps.

Keel for the *Ranger III* was laid on Jan. 21, 1958 and the vessel was successfully launched on June 21. Naval Architect R. A. Stearn of Sturgeon Bay made the original design of the vessel for the National Park Service and acted as their resident inspector during the entire construction of the vessel. Being a passenger vessel, the *Ranger III* was built to meet the rigid requirements of the



USCG, ABS and Public Health. Top deck of the vessel is beautifully appointed and provides an excursion seating area, smoking lounge and lunch facilities. An elevated observation lounge is located aft. The main deck has four private passenger staterooms, captain, mates and crew quarters, galley, etc., with hold forward for storing 100 tons of cargo. Loading is accomplished by a five ton crane located on the front deck and powered by a General Motors 2055 Detroit diesel. A Kohler emergency 10 kw light plant is located in the after deck and power is supplied by a Waukesha model 180 DLC diesel engine.

## List of Principal Equipment

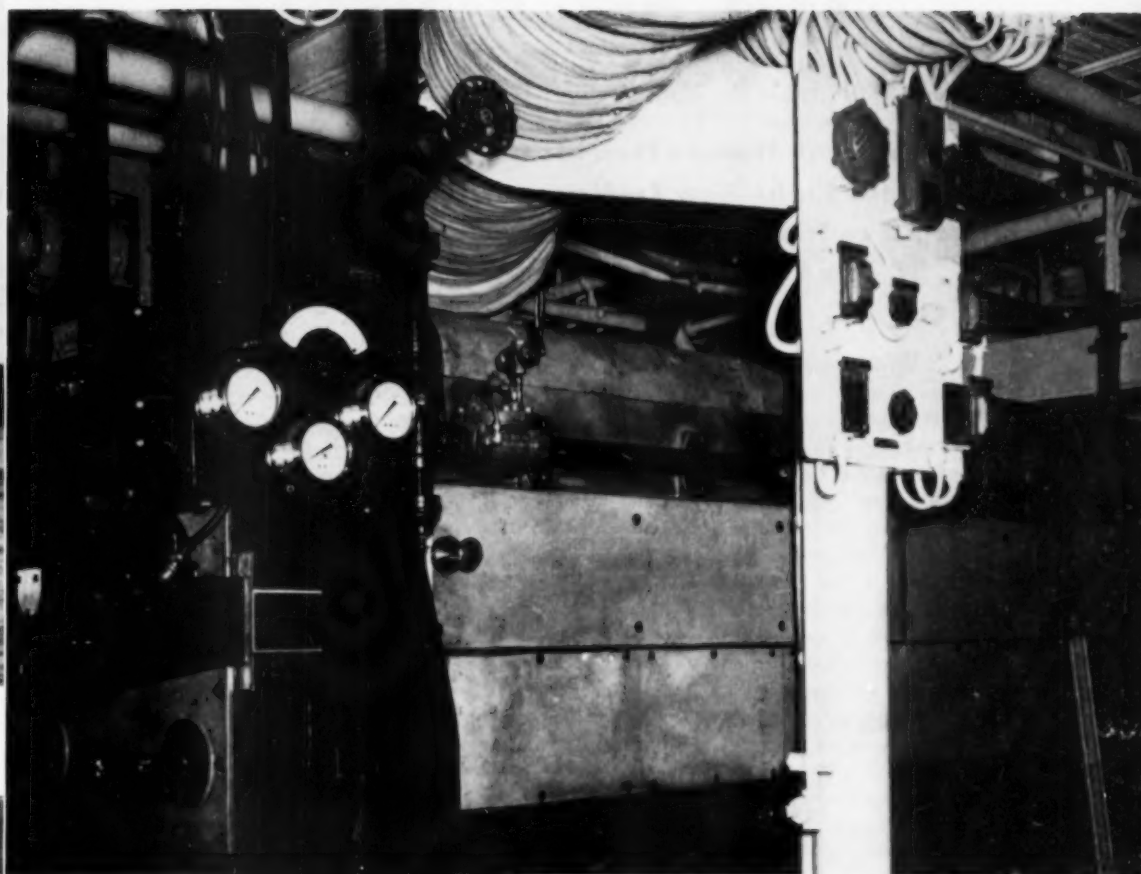
Engines	Kahlenberg
Propellers and Controls	KaMeWa
Governors	Woodward
Turbochargers	Napier





*M/V Ranger III on sea trials.*

One of many hand painted murals in smoking lounge.



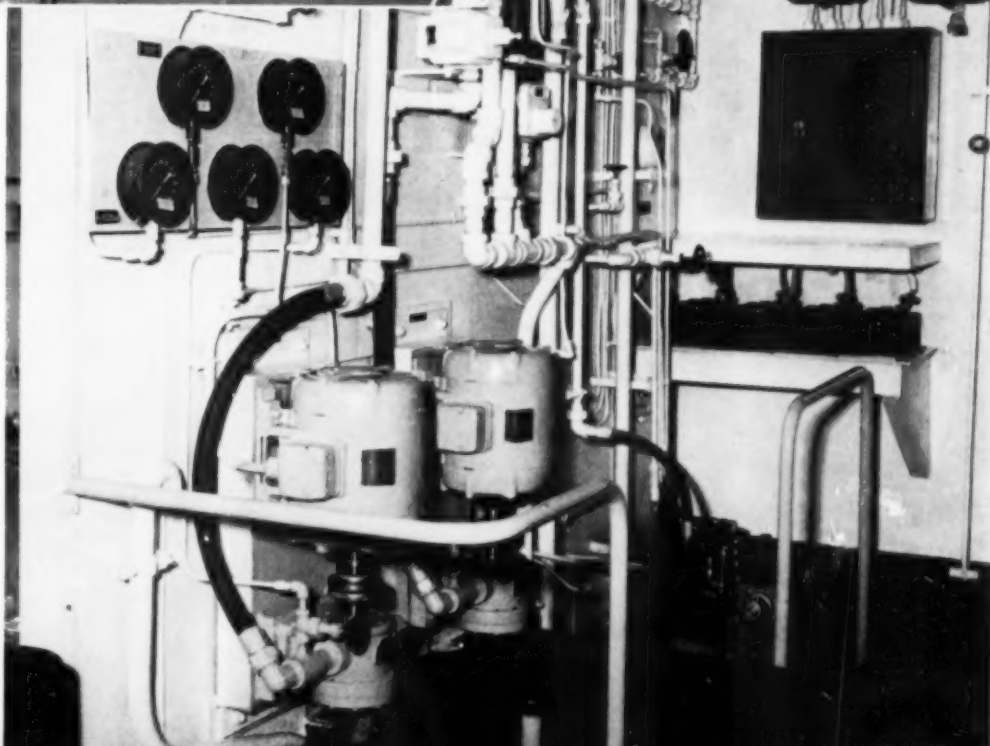
Port Kahlenberg 614 shp engine showing tachometer indicator, Alnor pyrometer and Esterline-Angus tachometer generator. Both diesels are equipped with Napier turbochargers.

KaMeWa oil distribution box at port shaft. Motor driven main and standby hydraulic pumps are in foreground. Both are operated when pitch is changed.



Five ton unit crane is powered by GM 2055 Diesel.

Auxiliary Generator Sets	Caterpillar
Emergency	
Light Plant	Kohler with Waukesha engine
Pyrometer	Alnor
Alarm System	Viking
Air Filter	Air Maze
Fuel Injection System	C.A.V.
Lube Oil Pumps	Futhill
Starting Air Compressors	Quincy
Lube Oil Filter	Nugent
Heat Exchangers	Yates American
Fuel Oil Filters	Purolator
Thrust Bearing Heat Exchanger	Young
Exhaust Silencer	Maxim
Thermostat Control	Amot
Raw Water Pumps	Kahlenberg
Air Horns and Controls	Kahlenberg
Air Receivers	Kahlenberg



# NEW ALL PURPOSE POWER LINE

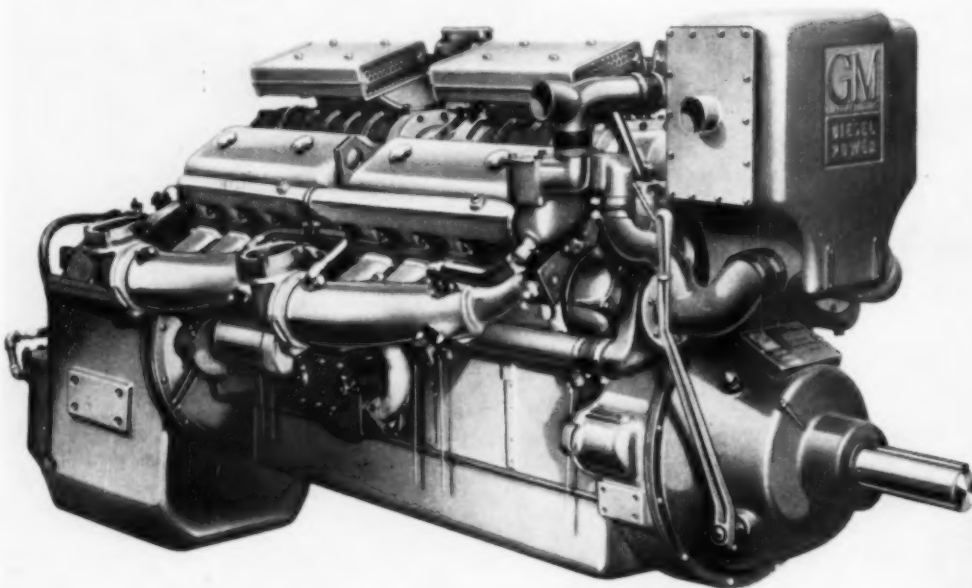
**General Motors Detroit Diesel Engine Division  
Announces Eight New In-line and V Type Engines in Range  
From 20 to 1650 BHP; Manufacturing Facilities Expanded  
30 Per Cent to Meet Production Requirements.**

**D**ETROIT, Michigan—Sound engineering and planning and a realistic appraisal and projection of diesel engine markets is the vibrant combination of elements that has sent the Detroit Diesel Engine Division of General Motors into one of the most widescale engine development and production programs seen to date in the diesel engine industry. The addition of eight new basic engines (four in a new 53 series and four in the established 71 series) has trebled the company's diesel line so that its engines now range from 20 to 1650 bhp. This includes five new V engines, the 6 cylinder V-53 and the 6, 8, 12 and 16 cylinder V-71. Basis for the program was well defined by General Sales Manager Robert E. Hunter when he pointed to, "a very real need in the industry for an all purpose power line that would provide equipment builders and users with an extensive selection of power while retaining design simplicity, operating reliability and basic parts interchangeability."

Substantial evidence of the scope of this program is found in a completely new 300,000 sq. ft. assembly and dynamometer test building. In addition, over 97,000 sq. ft. of existing floor space has been made available for manufacturing purposes by moving the parts warehousing to another plant owned by the company in Wayne, Mich. Altogether this means an expansion in manufacturing

space alone of approximately 30 per cent. Perhaps more important investment-wise is the addition of an entirely new array of special machinery which will be used for continuous-process machining of components such as blocks and heads.

Development of the new line of engines to expand the horsepower range both above and below that which was offered by the latest existing models has been an accelerated program over a three-year period. It meant the burning of a lot of "midnight oil" on the part of engine research, engine design, production planning, purchasing and sales



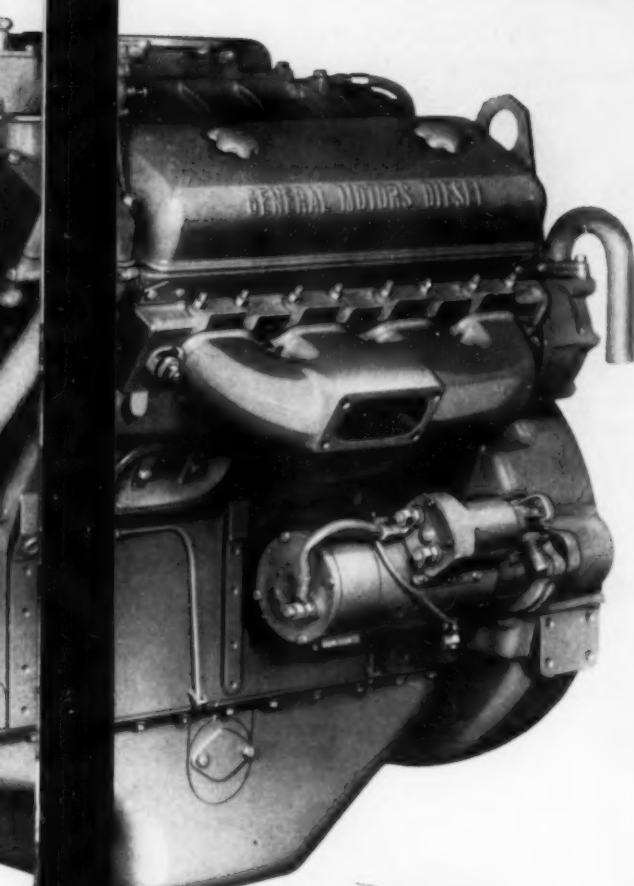
General Motors' new 16V-71 marine propulsion unit, with a maximum basic engine rating of 675 bhp at 2300 rpm. ➤

◀ *G. F. Becker*, 63 ft. flagship of the Frank Becker Towing Co., Detroit, put 780 hrs. of operation on a pilot model 12V-71 engine by Nov., 1958. With this engine the tug won top honors in the International Tugboat Race.



personnel. Under the guidance of General Manager Clyde W. Truxell, the market investigations were handled by Hunter and his marketing group. Design of the new engines to fit the market requirements was under the supervision of Charles W. Frederick, director of engineering with Kenneth Hulsing, chief design engineer and his group responsible for development. Product applications were the responsibility of Warren Oakley, product





Compact 334 maximum bhp 8V-71 GM diesel, in the fan-to-flywheel industrial version.

application staff engineer. The production planning was supervised by John E. McKenna, manager of purchasing and production and Eugene K. Kelly, works manager.

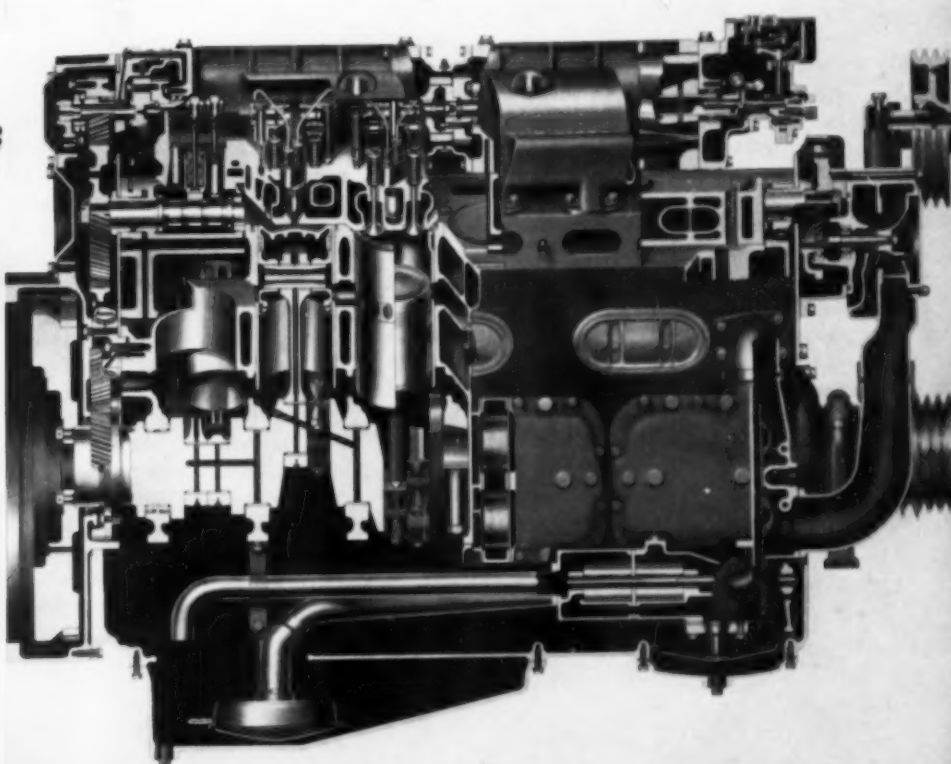
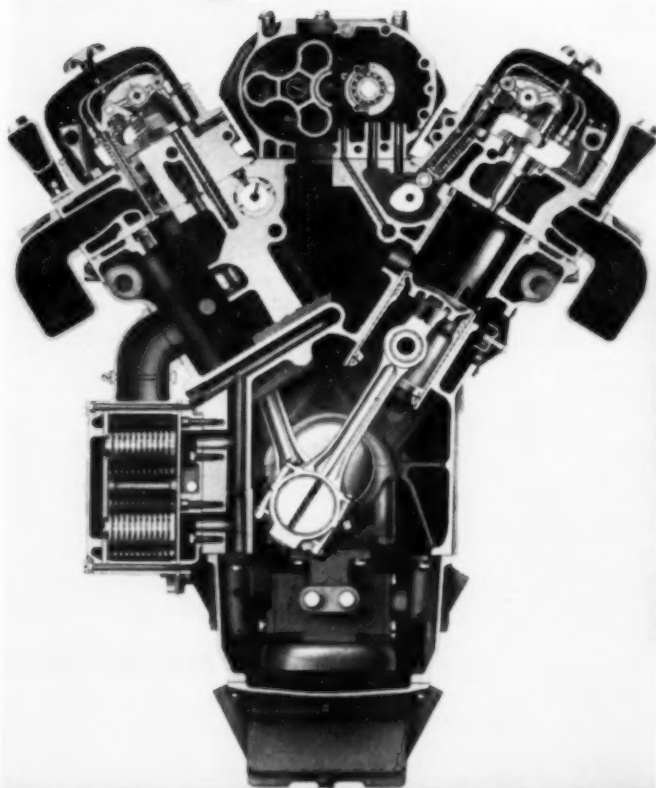
There are at least four interesting facets to the development of Detroit Diesel's new 20-1650 bhp all purpose power line. (1.) each of the eight new engines contains the same (or an improved) high power-to-weight ratio and the improved fuel consumption characteristics of the latest 71E engine design brought out by Detroit Diesel in 1957. (2.) great care has been taken to simplify tooling and manufacturing processes and to maintain maximum parts interchangeability by confining the number of cylinder bore-and-stroke sizes to only three for all of the 19 basic and multiple engines now in the GM line. (3.) after 20 years of in-line diesel engine manufacturing for a total of over 78,000,000 horsepower, Detroit Diesel has turned to a V type design in five of their eight new engines for the additional compactness and weight savings which were thus obtainable. (4.) coincident with the release of information on the new products and plant expansion, Hunter in an interview, stated that Detroit Diesel had effected a gradual but almost complete change-over in type of distribution from heavy equipment houses to engine houses whose sole interests will be the sale and servicing of engines and accessory equipment.

Detroit Diesel's new all purpose power line will include five of their existing basic models—the 2, 3, 4 and 6 cylinder series 71 engines and the 6-110 engine, the twin 4 and 6, the quad 6-71, and the twin 6-110 engine. On these existing models the



◀ Clyde W. Truxell, General Manager of the Detroit Diesel Engine Division.

↓ Cut-away side view and cross section of new 504 hp 12V-71 General Motors engine.



present options will be largely maintained, including turbocharging. Aluminum blocks will be available when desired for such applications as trucking and marine power; also the tandem twins which yield a long narrow silhouette desirable in some marine installations. The principal new features of these existing engines are the design changes which brought about the 71E engine in 1957 and which will be described later.

#### GM All-Purpose Power Line

Present Models	New Engines	BHP	
		Continuous	Maximum
	2-53	24-35	47
2-71		33-48	67
	3-53	38-64	97
3-71		51-75	118
	4-53	51-87	130
4-71		75-113	167
	6V-53	76-130	195
6-71		112-170	252
	6V-71	112-170	252
6-110		160-237	335
TWIN 4-71		150-226	334
	8V-71	150-226	334
TWIN 6-71		224-340	504
	12V-71	224-340	504
TWIN 6-110		320-474	670
	16V-71	300-454	675
QUAD 6-71		448-680	1008
	24V-71	448-680	1008
	(TWIN V-12)		
	32V-71*	600-908	1350*
	(TWIN V-16)		

\*When turbocharged 1650 HP.

The five new V type engines and three new in-line engines include four new series 53 units: 2-cylinder, 3-cylinder, 4-cylinder and "V-6" engines. The 53's are actually scaled down versions of the series 71 engines containing all of the latest 71E engine design features and with similar performance and fuel economy characteristics. The 53 engines are all of the same bore and stroke—3 $\frac{1}{8}$ "



in. by  $4\frac{1}{2}$  in. Series 71 engines have a bore and stroke of  $4\frac{1}{4}$  in. x 5 in. and series 110 engines have a bore and stroke of 5 in. x 5.6 in. In each case the series designation (53, 71, 110) is derived from the respective cubic inch displacement of a single cylinder of each engine. Short study of the horsepower chart illustrated shows the complete range of horsepowers available from Detroit Diesel's basic engines, blower-aspirated but without turbocharging. Planning calls for immediate production of these basic engines in the form of marine, fan-to-flywheel and base-mounted industrial units with turbocharging available at first only on the series 71 and 6-110 models. Turbocharged models of the five new V engines will then be announced and aluminum block models on all the new engines will also follow later.

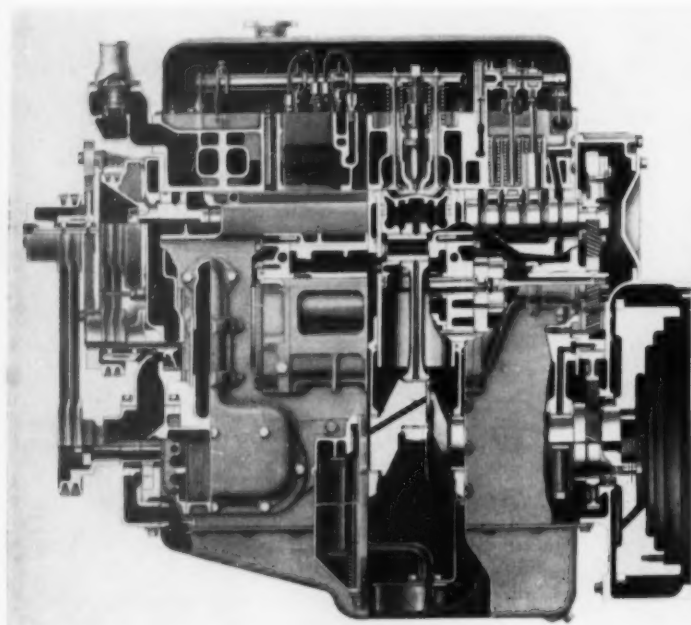
Beginning with some experimental truck engine installations and exhaustive field testing in 1955, Detroit Diesel started a series of design changes on their series 71 engines which culminated in the release of the 71-E engines in 1957. Major

tors) used 10 per cent less fuel per bhp hour than the series 71 engines of 1954.

Although the 71E engines were originally produced in 4 and 6 cylinder sizes specifically for the trucking industry, they were later released in both cast-iron and aluminum versions for the marine industry and now are available "across the board." Gains made in performance, fuel consumption and power per pound are carried over into Detroit Diesel's new engines by patterning them on the same principles (and in many cases using the same parts) as used in the 71E. Performance curves based on both test and field operation of the new 6V, 8V, 12V, and 16V "71" engines show .400 lbs./bhp/hr. fuel consumption at 1600 rpm. As is characteristic with most smaller diesel engines the fuel consumption per bhp hour of the 53 series engines is slightly higher, or in the range of from .416 for the 4-53 (with 4-valve head) to .460 lbs./bhp/hr. for the 2-53. Where economy of operation down to the last decimal is of importance to the user, 4-valve heads will be available on all

engines are identical—two 4-cylinder in-line 71 heads fitting perfectly on an 8V-71 for example; two in-line 3-53 heads on the 6V-53. The 12V-71 engine carries two in-line 6-cylinder heads; the 16V-71 engine is assembled with four in-line 4-cylinder heads. Thus only four basic cylinder heads (2, 3, 4, and 6-cylinder in-line heads) serve in the assembly of all the "71" in-line engines as well as in the assembly of the 6V, the 8V, the 12V and the 16V-71 engines. The 16V-71 is made up of two 8V-71 blocks rigidly bolted together. This brings two main bearings in close juxtaposition at the longitudinal center of the engine and provides 10 main bearings in all for the 16V-71. The building block principle is carried out also with respect to the engine blowers. For the 6V, 8V, 12V and 16V-71 engines only two sizes of blowers are built; a 6-cylinder and an 8-cylinder size. The 12V-71 is served by two 6-cylinder blowers; the 16V-71 by two 8-cylinder blowers.

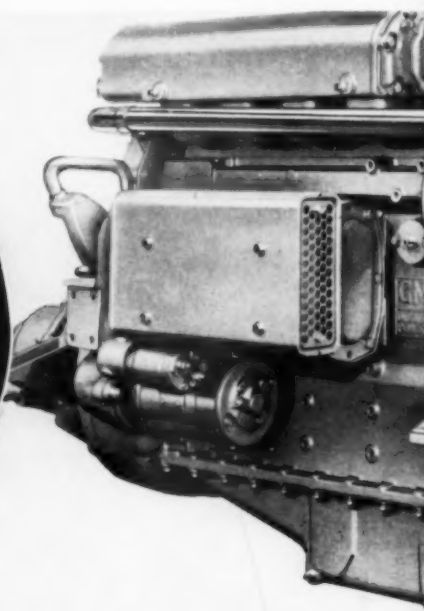
By keeping the number of cylinder sizes to a minimum Detroit Diesel has also kept a high degree of



Cut-away side view of the new GM 4-53 with 4 valve head.



Pilot model installation of a new GM 3-53 engine was made in this core drill exploring for iron ore in Michigan's upper peninsula.



GM 4-53 in-line marine propulsion unit with Warner reverse and reduction gears.

changes included a new piston with a new type upper compression ring placed much closer to the top of the piston; a 38 per cent enlargement of the air intake ports and a new 4-valve per cylinder head for better engine breathing; a new low speed blower, producing less parasitic hp loss and modified fuel injectors. The "fire ring" upper compression ring increased piston life and boosted the effective compression ratio. Improved breathing because of the larger intake ports in the cylinder liner and the substitution of four exhaust valves per cylinder for the two previously used permitted slowing down the scavenging blower. The increase in efficiency resulting from this combination of changes permitted the use of smaller injectors, with 55 cu. mm and 60 cu. mm injectors giving performance equal to the 60 cu. mm and 70 cu. mm injectors previously used in truck engines. As a result of these changes fuel consumption showed a marked improvement, so that the series 71E engines of 1957 (with 60 cu. mm in-

jectors) used 10 per cent less fuel per bhp hour than the series 71 engines of 1954.

Since the first series 71 engines were produced GM has adhered to what we would call a "building block" technique whereby parts and sub-assemblies of one engine may be used "as is" or with modifications in length only, in other engines of the same series. In designing the new all purpose power line, Detroit Diesel engineers have adhered faithfully to this principle. In the new V engines for example, it was found that by using a V angle of approximately  $62^\circ$ , the twin cam-shafts of the V engines fell in exactly the same relative location as the cam and balancer shafts of the in-line engines and that the same gear train could be used on both the in-line and V types. As a result, drilling and machining of the end-plates for both in-line engines and V-type engines can be accomplished on the same machines. Another example of this basic design ingenuity is evidenced by the fact that cylinder heads for the in-line and V en-

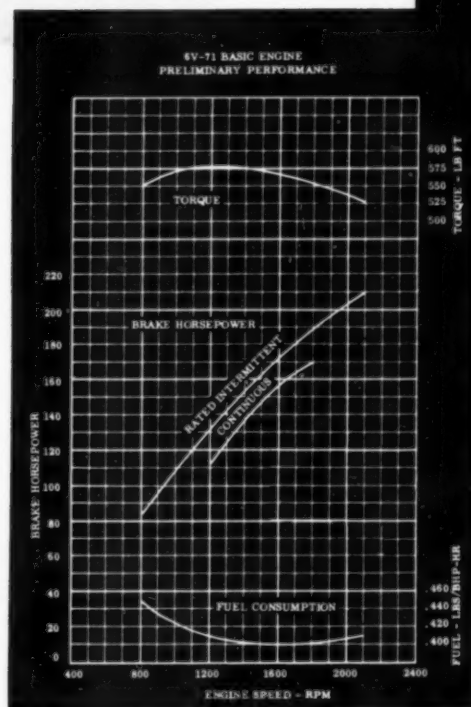
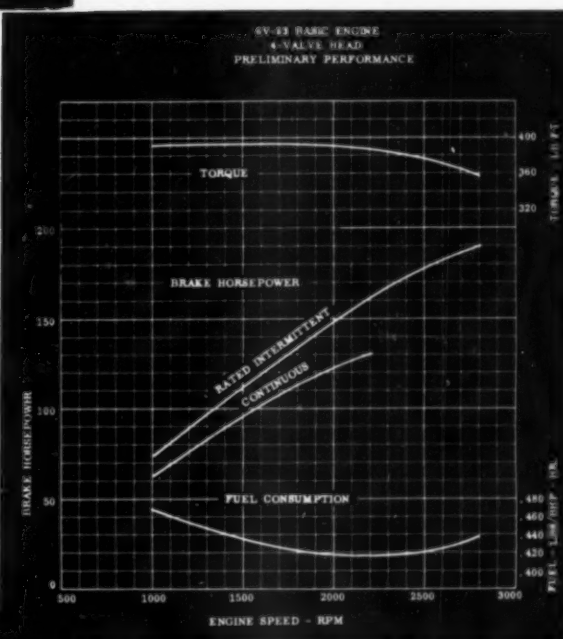
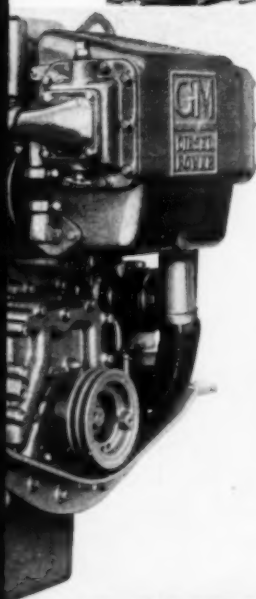
gines are identical—two 4-cylinder in-line 71 heads fitting perfectly on an 8V-71 for example; two in-line 3-53 heads on the 6V-53. The 12V-71 engine carries two in-line 6-cylinder heads; the 16V-71 engine is assembled with four in-line 4-cylinder heads. Thus only four basic cylinder heads (2, 3, 4, and 6-cylinder in-line heads) serve in the assembly of all the "71" in-line engines as well as in the assembly of the 6V, the 8V, the 12V and the 16V-71 engines. The 16V-71 is made up of two 8V-71 blocks rigidly bolted together. This brings two main bearings in close juxtaposition at the longitudinal center of the engine and provides 10 main bearings in all for the 16V-71. The building block principle is carried out also with respect to the engine blowers. For the 6V, 8V, 12V and 16V-71 engines only two sizes of blowers are built; a 6-cylinder and an 8-cylinder size. The 12V-71 is served by two 6-cylinder blowers; the 16V-71 by two 8-cylinder blowers.

By keeping the number of cylinder sizes to a minimum Detroit Diesel has also kept a high degree of



or right-hand side of the engine and design of the cylinder heads allows the exhaust manifold to be placed on either the blower side or the opposite side of the engine. Added to this, right and left-hand rotation options gives four distinct accessory arrangements and eight basic options as to arrangement and rotation for each in-line engine. In the V type engines, the blower or blowers are mounted horizontally in the top of the V and do not project above the rocker arm covers of the cylinder banks. This permits the blower to be driven by a gear which meshes with one of the top (cam shaft) gears. In the V type engines no balancer shaft is used as the function of balancing out reciprocating forces is taken care of by contra-rotating weighted pulleys mounted on the front ends of the two cam shafts. These pulleys are out in the open—available for additional accessory drives. The arrangement does away with the neces-

One of the field-test applications of the new GM diesel model 2-53 engine was in this 300 amp., 40 volt welder.



sity of additional housing to cover the balance weights (used in previous designs) and shortens the engine silhouette. The same arrangement is used in the new in-line 53 engines except of course that there is only one camshaft plus a balancer shaft on which the two weighted pulleys are mounted. As in the previous series 71 engines, the cam shafts of all the new engines, in-line or V are mounted high in the block (just below the head) which permits short push rods. On the V engines the governor is mounted at the top of the engine on the front of the main blower housing and is driven off the blower. On in-line series 53 engines the governor is mounted on the side of the engine opposite the blower. In-line engine starters may be mounted on either side of the flywheel housing.

The new series 53 engines will all be provided with a wet type liner. This is a departure from Detroit Diesel's previous engine designs. Mr. Hulsing, chief design engineer, said that the company sees little operational advantage either way, but said that coring castings for dry liners in smaller

blocks is more difficult than for the larger engines.

In looking over the requirements of the potential markets, Detroit Diesel envisioned the need to expand their engine line in both directions. Continually increasing power requirements on the part of the heavy construction equipment industry indicated the need for the 8V-71 and the 12V-71 in both standard and turbocharged models and it is felt that there will be a definite need for the 12V-71 and the 16V-71 in large off-highway ore and coal haulers and scrapers. Replacing multi-engine power with the relatively light and compact 12V-71 for instance would mean the elimination of one complete transmission line and a savings in OEM manufacturing cost and subsequent maintenance. GM still recognizes the need for in-line engines in many applications but the 6V-71, 335 lbs. lighter, nearly 12 in. shorter and less than 4 in. wider than its in-line counterpart the 6-71, should be a welcome innovation to manufacturers of heavy-duty highway vehicles. The 334 max. bhp 8V-71 can replace the 335 bhp 6-110 with a savings in weight of 955 lbs., in length of nearly 15 in. and in width of 2 1/4 in.

Going to the V configuration has so reduced the weight to horsepower ratio that the 6V-71 has a maximum performance rating which works out at 7.3 lbs./bhp; the 8V-71 at only 7.0 lbs./bhp, the 12V-71 at 6.3 lbs./bhp. A weight to horsepower ratio of only 5 lbs./bhp is reasonably well in sight when production of aluminum blocks for these engines is begun. The 6V-53 engine, in the cast-iron version, will weigh only 1340 lbs. and its maximum intermittent rating of 195 bhp at 2800 rpm will give it a weight of only 6.9 lbs./bhp. Since the 6V-53 fan to flywheel engine is only 34 1/2 in. long by 31 1/2 in. wide, Detroit Diesel sees a great future for it in medium size trucks and is developing a strong marketing program. Detroit Diesel personnel claim this to be the shortest, lightest, most compact diesel power unit yet to be designed for such service. With respect to the smaller 2, 3 and 4 cylinder 53 engines in the 20 to 130 hp range, it is the company's contention that any gasoline engine owner who takes into consideration the maintenance costs per year will find it to his definite advantage to "go diesel" with one of these units. Small boats, tractors, front-end loaders, refrigerator cars, transit-mix truck auxiliary engines, 3/8, 1/2 and 3/4 yd. shovels, lift trucks, irrigation pumps, small standby generators—all these and more will be the sales target for these engines.

By introducing the V type 2-cycle engine Detroit Diesel now can project sales into equipment applications heretofore impossible because of size or horsepower limitations. This applies not only to new OEM equipment but to machines currently in the field. For a year or more Detroit Diesel has had pre-production models of various engines in its new line working in various types of equipment across the country. As yet most of these can not be publicized without divulging information which might be contrary to the interests of equipment manufacturers concerned. Detroit Diesel's unprecedented development of eight new engines at once is an encouraging sign for the future of the whole diesel industry. A forthcoming issue of DIESEL PROGRESS will present Detroit Diesel's expansion of its production facilities.





## SLEEK M/V SAM HOUSTON PROMOTES TEXAS PORT

**Port Commission Uses Plush, Air-Conditioned  
Boat Powered by Two 525 hp Fairbanks-Morse Diesels  
To Give VIP's Waterline View of Industrial Sites on  
Houston Ship Channel.**

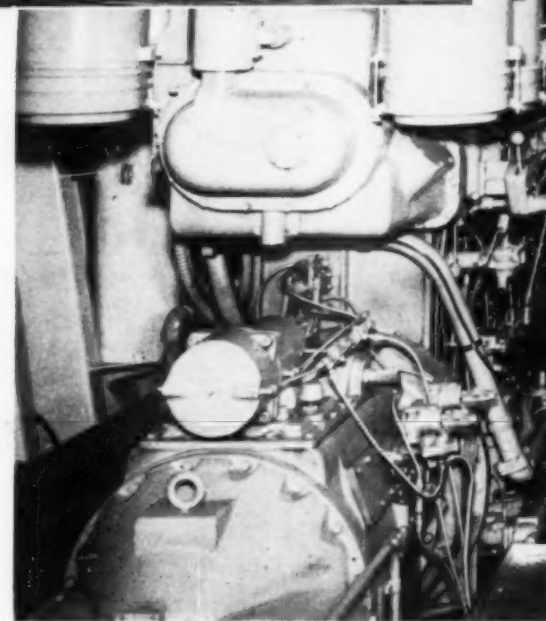
By DONALD M. TAYLOR

**W**ANT to locate a plastics manufacturing plant or perhaps a steel mill on a deep-water ship channel in an area where raw materials are bountiful and industry is growing by leaps and bounds? If you do, just drop a note to the Houston Chamber of Commerce, and you'll get a sales pitch on the area that will set your head swimming: Seems Houston is the nation's third largest sea-port despite its distance from the sea; and such items as sulfur, natural gas and raw petrochemicals are bountiful and usually cheap. If you pursue the matter further, chances are, one day you will find yourself enjoying a cruise on the M/V *Sam Houston* as a guest of Houston's Port Director, Jerry P. Turner. And because there is a chance you might bring new industry to the booming area, you'll receive the treatment accorded VIP's as you make a waterline inspection of choice industrial real estate.

Being a guest on the 95 ft. long *Sam Houston* has its advantages. The vessel cost \$275,000, and its appointments rival or excel those of any luxury yacht afloat. You will be impressed by the soft background music, lack of noise and vibration. Explanation for the latter qualities can be found in the engine room. The two, six-cylinder, 525 hp

Fairbanks-Morse model 38F 5¼ diesel engines have vertical power cylinders with opposed pistons that tend to cancel out or at least suppress the amplitude of the vibration. This does not mean that you can carry on a whispered conversation in the engine room with the engines revved up to 1200 rpm, but little of this is carried topside.

According to the Port Commission, the *Sam Houston* is an inspection boat, and L. B. Christenson Engineers, Inc. of Pesedena, Tex. who designed the 95 ft. by 24 ft. vessel and the nearby Platzer Shipyards were careful to see that the boat itself would stand a thorough inspection. The engine room seems as white and sterile as a hospital ward, and there is ample head room throughout. The twin diesel propulsion units are mounted on either side with a Stewart & Stevenson 75 kw generator in the middle. The latter unit which is powered by a General Motors, Model 4-71 diesel, provides electricity for the lighting, the Carrier air-conditioning unit, radios, TV's and the auxiliary air compressor. There is provision to take power from shore when the vessel is at its berth. The automatic voltage regulator is a Simplex model VRIF. Compressed air is important on this boat because the engines have pneumatic starting motors—In-



gersoll Rand 20 BM's—and the control system must have a minimum of 100 psi air in the 24 in. by 84 in. receiver to function properly. The compressed air is supplied by three compressors: two are belt-driven from the main engines and the other, an auxiliary, is driven by an electric motor. All three were manufactured by Southern Engine & Pump Co. of Houston. Engine jacket and lube oil cooling is accomplished through a single closed system similar to those found on many modern river tugs. Engine heat is rejected to the water beneath the hull through cooling coils, eliminating the conventional raw-water heat exchangers and an extra circulating pump.

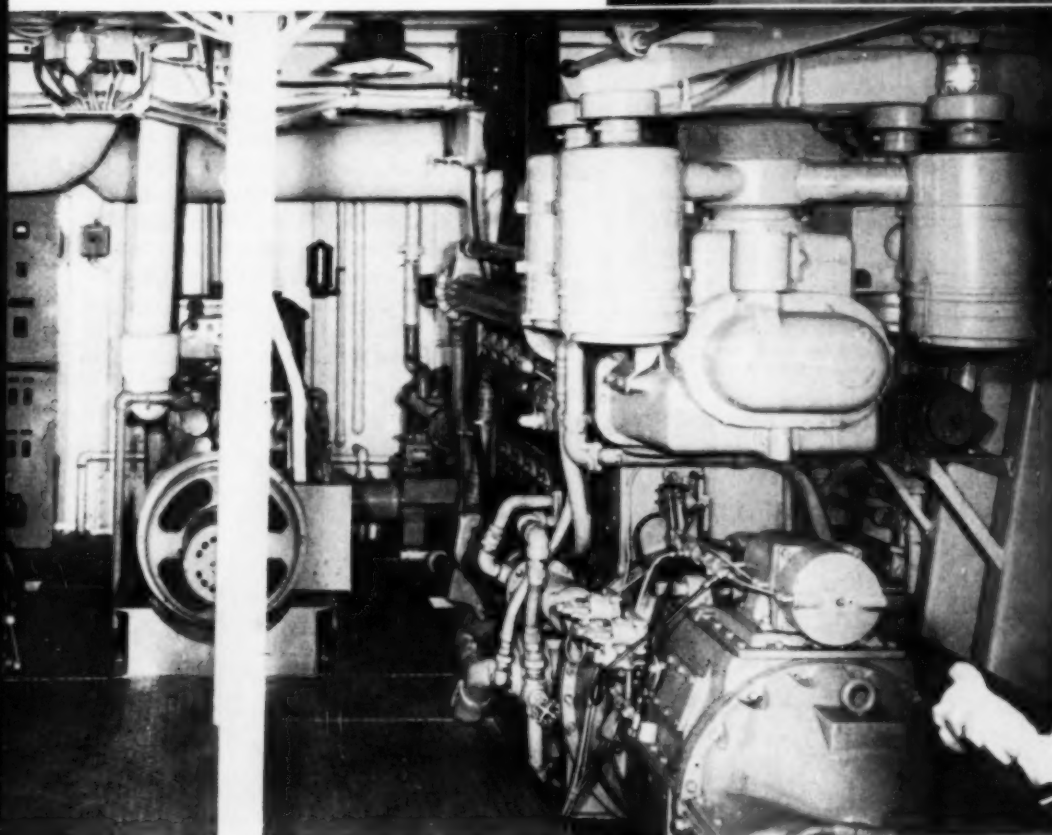
A one-word description of the *Sam Houston's* controls is, "slick!" Throttles in the pilot house actuate the Westinghouse system, and the response on the propellers is almost as rapid as that of



outboard motors. Moreover, reliability is such, that the chief engineer is rarely required in the engine room during a voyage. Briefly, here is the way the system works: When the throttles are moved to the first "Forward" or "Reverse" notch, a pneumatic ram, (Westinghouse Tridyne) shifts gears on the Snow Nabstedt 2:1 reduction gears. The engine speed is held at idling until the shift is accomplished; then additional movement of the throttles actuates the pneumatically operated Woodward PSG governors through a directional choke. Purpose of the latter is to insure smoothness in engine power build up while retaining instantaneous response in power reduction when the throttles are "chopped." The speed with which the engines can be reversed is amazing in view of the somewhat over-sized propellers—they are Michigan Star's, 48 in. by 38 in. and 5 bladed. Carrying capacity of the *Sam Houston* is 100 and its cruising range with the 4000 gallon tanks full is 740



➤ Beautifully wood-paneled bar assures fine hospitality for all guests touring the Houston Ship Channel.



➤ Engine room of the M.V. *Sam Houston* is well arranged with propulsion power supplied by these two compact Fairbanks-Morse 525 hp O-P engines. Top speed on the vessel is 16 mph.

➤ Main lounge is well appointed with large windows providing excellent view of the port. A public address system is used to identify points of interest.

miles at 14 miles/hr. So far, the vessel has logged about 1200 miles per month, for the most part making short round trips down the ship channel. Civic and educational groups account for most of the passengers, but its owner, the Harris County Ship Channel Navigation District, feels that the somewhat stiff investment it represents has been well placed.

#### List of Principal Equipment

Main Engines	Fairbanks-Morse
Auxiliary Generator Set	Stewart & Stevenson
Governors	Woodward
Reduction Gears	Snow Nabstedt
Pneumatic Controls	Westinghouse Air Brake
Air Starting Motors	Ingersoll Rand
Air Filters	Air Maze
Switchboard	Simplex



# UNIQUE NON-ELECTRIC INDICATING RELAY SYSTEM

**I**N connection with engine safety control systems there has been a need for an indicator which would indicate to the operator which safety control component shut down his engine. If the operator knows what caused his engine shutdown, he can save hours of investigation as to the cause, and can immediately proceed to take steps to remedy the trouble. This is important both in constantly attended stations and in unattended stations in which the attendant may not come across the engine until hours after, or even days after the shutdown occurred. The use of the Amot model 2400 Indicating Relay in combination with the Amot Safety Control System is a mechanical method of indicating which safety control component caused the engine to shut down. One indicating relay is used for each component, and only the window shows on the panel board.

Figure 1 is a typical diagram for manual start engines and in this system the engine is started by raising the reset latch and then the lever on the 1476A $\frac{1}{2}$  unit. This admits control pressure to the pressure-operated fuel shut-off device so that the engine can be started. Control pressure is also admitted to the indicating relay system. Before the engine starts, one or more of the dump valves may be venting pressure and some of the windows may

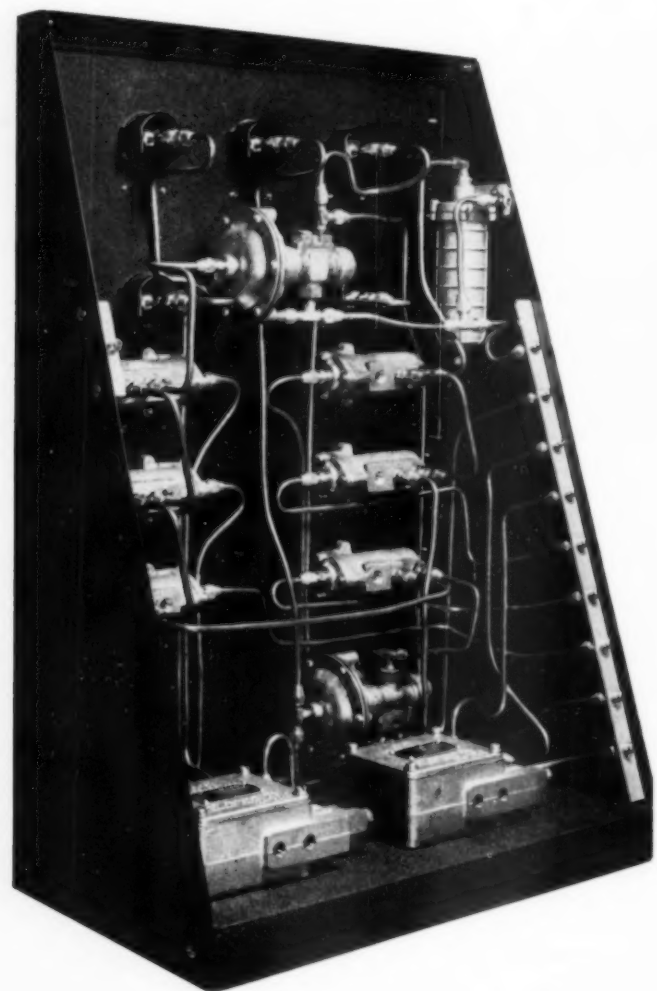
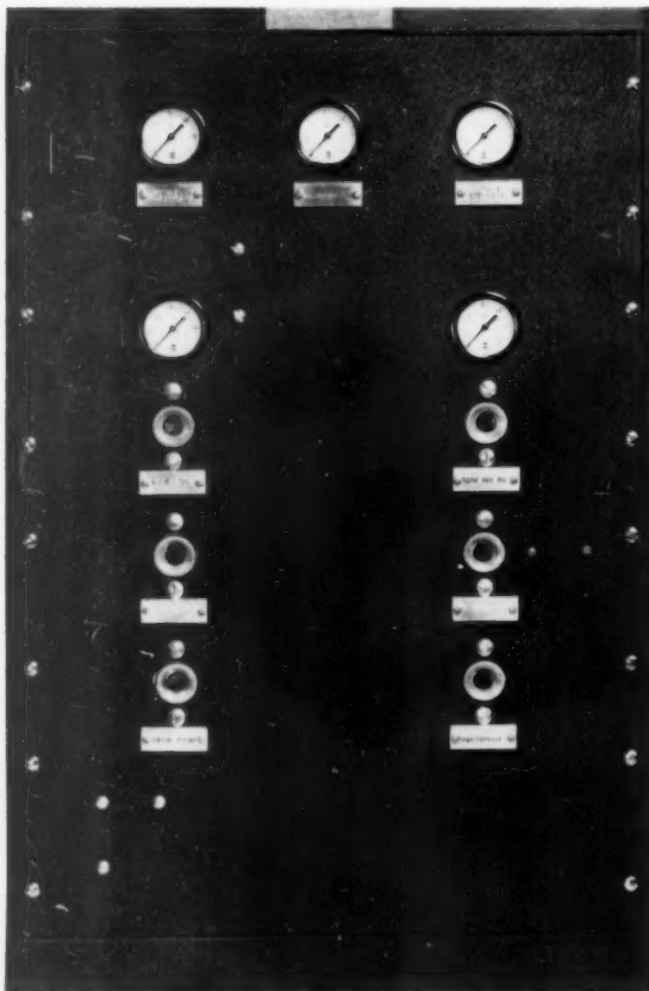
show "red". After the engine is started, with everything normal, all of the dump valves will cease to vent the pressure and all of the indicating relay windows will automatically reset themselves to show "green". After all of the relays have reset themselves, the control pressure is transmitted to the 1476A $\frac{1}{2}$  bonnet which causes the reset latch to drop out. This makes the unit ready to trip and shut off the engine in event of an abnormal condition is sensed by one of the dump valves. When restarting the engine it is essential that the reset latch drops. Failure of the latch to do so indicates an abnormal condition and continued operation may result in damage to the engine. In the event of an abnormal condition such as low oil pressure, ie. if dump valve #3 was a valve, sensing oil pressure, this valve would vent the pressure causing relay #3 to move and indicate "red". The causes #2 relay to vent, which in turn vents #1 relay, causing pressure at the bonnet to become zero, thus tripping the 1476A $\frac{1}{2}$  unit and shutting off the engine. Only the dump valve causing the shutdown will cause its corresponding relay to show "red". After shutdown all win-

dows will show "green" except the one responsible for the shutdown.

One feature of the Amot Indicating Relay system is that it can be added to existing engine installations with no change whatsoever in the existing method of starting engines which are manually started. Therefore, there is nothing new to be learned by the operator. All that is required to operate the system is a source of either air pressure or gas pressure. The system is excellent for use on either diesel, gas, or dual fuel engines. Mechanical safety control components are available to shut down the engine for almost any desired reason, thereby eliminating the need for electricity.

Figure 2 shows a system using air only as the control medium, which can be universally applied to any type of engine. Figure 3 shows a system using both gas and air as control mediums, which might be desired on gas engine applications. Other systems can be developed which use gas only. Both Figures 2 and 3 can be applied to manual or automatic starting systems. All pieces of equipment shown on these diagrams are available from Amot. It should be remembered that these diagrams are basic, and if certain automatic sequencing opera-

Front and rear views of panel board designed for pedestal mounting. Six ft. panel boards for floor mounting are also produced by Amot.





tions are desired, additional components must be worked into the system. Referring to Figure 2, starting sequence is initiated by operation of either the remote or manual pilot valves. This opens the starting air valve, and at the same time energizes valve (3) to connect A to B. Control pressure thus opens the #2180 gas or #2410A½ fuel shut-down valve, and blocks out the low lube oil and low fuel pressure controls (#1672X). The accumulator and check valve (4) provide an adjustable time delay to allow lube oil pressure to rise to normal. When fuel pressure rises, valve (2) is energized and admits control pressure to the #2400 relays; and when air pressure bleeds from valve (3) C and B are connected and the whole system is ready to function on an emergency. On shutdown, the function causing the shutdown vents its respective #2400 indicator, making it go to red; the pressure is vented from the fuel valve, closing it. Valve (2) slowly closes and shuts off control pressure to the system while the engine is shutdown. Figure 3 has essentially the same sequence of operation as Figure 2 except that gas pressure is the control medium, and a supply of 50 psi air is required only on starting. If desired 40 to 50 psi gas can also be used in place of the air. Fig. 3 can be used on existing manual start engines with no change in the starting or shutdown procedure. For remote or automatic starting a few changes are required. Patents are now pending on these new systems.

Panel boards, completely piped, tested and ready for installation are available from Amot Controls Corp. in Richmond, Calif.

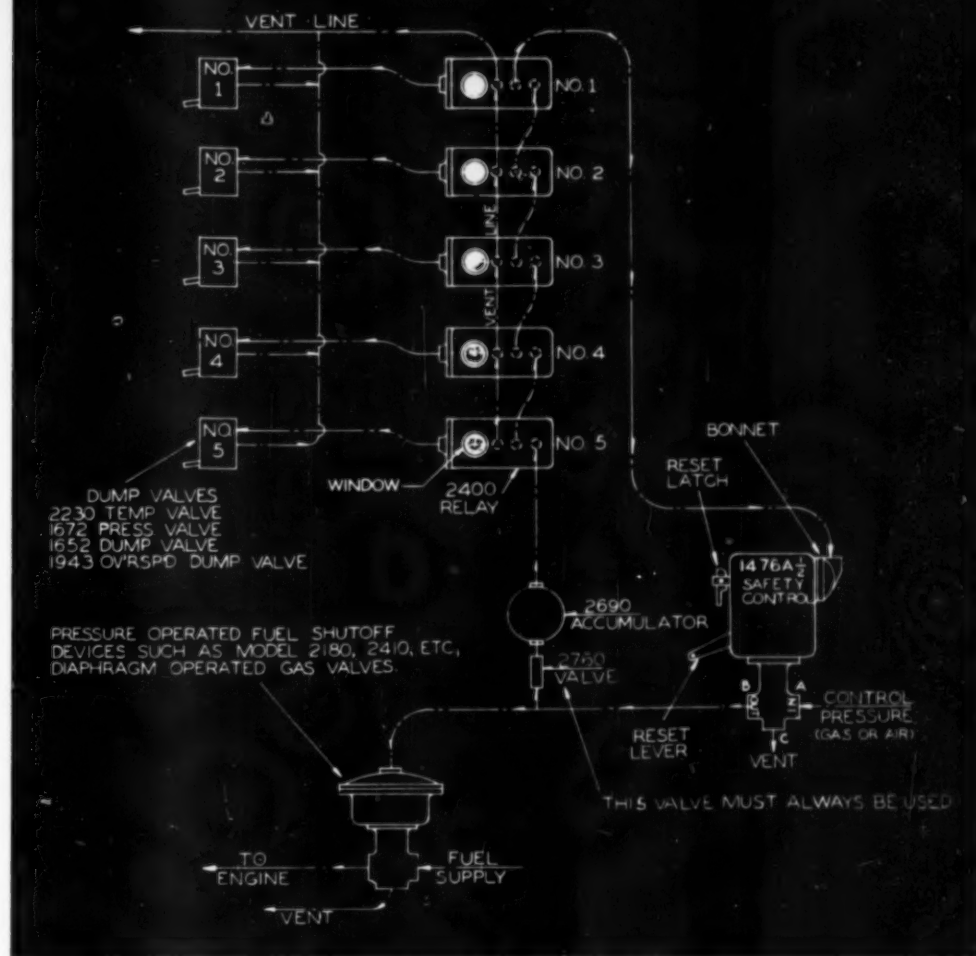
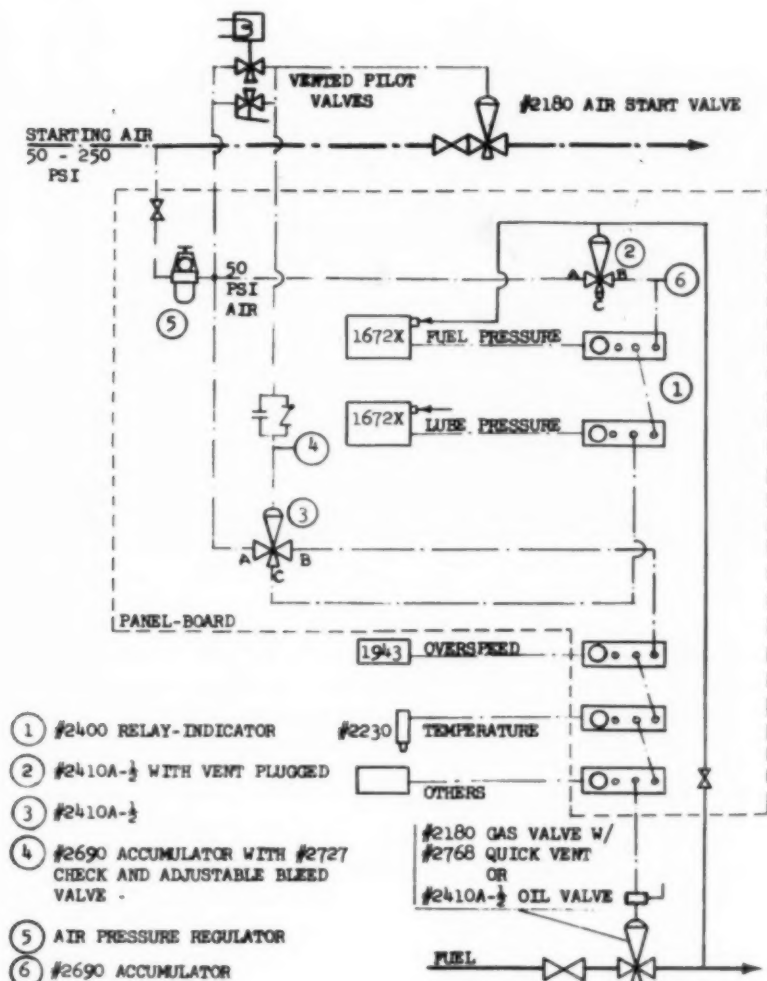


Figure 1. Typical diagram for manual start engines.



- 1 #2400 RELAY-INDICATOR
- 2 #2410A-½ WITH VENT PLUGGED
- 3 #2410A-½
- 4 #2690 ACCUMULATOR WITH #2727 CHECK AND ADJUSTABLE BLEED VALVE
- 5 AIR PRESSURE REGULATOR
- 6 #2690 ACCUMULATOR

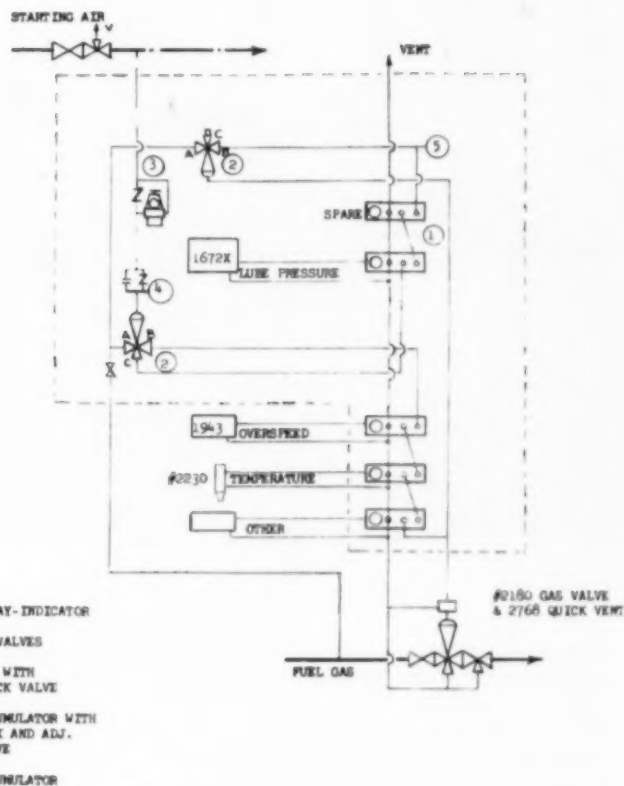


Figure 3. System using gas and air for manual or automatic start.

Figure 2. System using air for manual or automatic start.



# PILOT GOES TO TOWN

**New Diesel Equipment Increases Efficiency of Large Eastern Freight Carrier Serving Textile and Tobacco Industries; OTR Miles to Exceed 20 Million in 1958.**

By DOUGLAS SHEARING

**E**VERY business with wise and efficient management attempts to take advantage of its opportunities. Pilot Freight Carriers, Inc. is such a company and one of the leading common carriers. With headquarters in Winston-Salem, N. C., it is in the midst of the textile and tobacco in-

dependable service. Service, Pilot-style, is personalized from the time of pick-up to the ultimate delivery of each shipment to its consignee. Shipments are routed, dispatched and transported on time. Requirements of Pilot's customers are met. This determination to provide the ultimate in



Here is one of the 110 new Cummins powered Diamond T tractors recently placed in service by Pilot.

Pilot headquarters in this modern, brick two story office building in Winston-Salem, N. C. To the left is Pilot President R. Y. Sharpe.



dustry. Great emphasis is placed on handling textiles because of the company's proximity to manufacturing sites and its franchise rights make the Pilot name prominent in all of the metropolitan cities on the eastern seaboard. A comparatively young company, Pilot was founded in 1941 by R. Y. Sharpe, now its president. During the less than two decades since its birth Pilot's history is one of steady growth. This is no accident. Regardless of the vigor, aggressiveness and sound management policies of Sharpe and his executive team, growth such as this didn't just happen. Rather, it is the inevitable result of the firm's giving shippers good

service is reflected by the carrier's slogan—"With Pilot, service is a frame of mind." This frame of mind is evident from dock helpers to President Sharpe, and no doubt is instrumental in accounting for the steady increase in the carrier's tonnage and rising gross revenue. In 1957 the firm compiled over 19 million miles in its over-the-road program and with 1958 nearly complete as this story is written, Pilot fully expects its OTR mileage to exceed 20 million. The lion's share of this total is "racked-up" by new diesel equipment.

Today Pilot is operating 141 pieces of diesel line

equipment in its OTR program with 31 Whites and 110 Diamond T COE sleepers. Power for both tractors is supplied by Cummins with 175 hp, 2500 rpm turbocharged engines in the former and 180 hp, 2000 rpm model HRFB diesels in the latter. Fuller RoadRanger transmissions are also applied on both with the Whites using R-46 eight speed units and Diamond T tractors employing ten speed, R-96s with Spicer 14 in. clutch. Rear axles on the Whites are the builder's model 189C, 22,000 lbs. capacity and the Diamond tractors use Eaton series 2011 with a rated capacity of 23,000 lbs. Both Fram and Purolator fuel filters are used in-



Diamond T diesel tractor is tested on a Clayton dynamometer with full instrumentation to thoroughly check power, speed, fuel pressure, general engine performance, etc. to insure perfect operation.

terchangeably on both tractors. Luber-finer lube oil filters, model 750 are installed on each. Tires on all units are 10:00 x 20.

Attaching great importance to operating economy and reliability, Pilot has developed and adheres strictly to a fine preventive maintenance program. Complete facilities are housed in a modern building in Charlotte, N. C. and the tractors subjected at definite mileage intervals to six inspections: 1A at 3500 to 4500 miles; B at 12,000; C at 48,000; D at 100,000; E at 200,000 and F at 400,000. The F inspection calls for the complete overhaul of the engine, transmission and differential as well as generator, compressor, etc. Facilities are unusually complete and modern and the work is handled with dispatch by skilled mechanics. Evidence of the completeness of the Pilot program is the detailed driver line vehicle trip report illustrated in the upper right of the page.

As mentioned, the hub of this system is at Winston-Salem where Pilot maintains a modern, air-conditioned, two story office building. Here is the nerve center of an operation that fans out to 25 terminals from Georgia to the Canadian border. A vast lease wire automatic teletype system combines with a central dispatch system to provide an up-to-the-minute picture of the operation at any time. Each terminal manager reports to central dispatch at frequent intervals the trucks moving out of his area and gives their destination. In



turn he receives reports of trucks coming into his area. This enables him to plan his work schedule by knowing the long-haul equipment he will have available for the remainder of that day and early the next day. This system is used to trace shipments and for many other communication requirements to expedite shipments.

To give the fastest possible time in transit, Pilot operates its COE diesel sleepers with two men on all trips scheduled for ten hours or more duration. Teamed with all diesel tractors are the latest

type aluminum trailers with maximum cubic capacity. Largest trailers are 40 ft. long with a capacity of 2535 cu. ft. and they are used to advantage where permitted. Pilot in addition has 38 and 35 ft. units as well as open top and refrigerated trailers for special shipper requirements. Drivers, Pilot recognizes, are the heart of the successful organization and the company points a significantly low accident rate. Several of its drivers have reached the 10 year mark of Safe Driving and each year the company makes more than 250 Safe Driving Awards.

PILOT FREIGHT CARRIERS, INC.															
LINE VEHICLE TRIP REPORT															
Trailer No.	Weight	From	To	Date	Trailer No.	Weight	From	To	Date						
EQUIPMENT COMMENTS															
<input type="checkbox"/> Trailer and Trailer Received in Satisfactory Condition Free From Visible Accident Damage <input type="checkbox"/> Fills Wheel Locked in Proper Position Driver's Signature: _____															
EQUIPMENT COMMENTS															
<input type="checkbox"/> Trailer and Trailer Received in Satisfactory Condition Free From Visible Accident Damage <input type="checkbox"/> Fills Wheel Locked in Proper Position Driver's Signature: _____															
SPEEDOMETER READINGS															
Start				End				Start				End			
FUEL AND OIL															
FUEL CHANGED															
OUTSIDE TEMPERATURE (Fahr. C. & F.)															
ROADS USED															
L. H. ROAD M. H. ROAD P. H. ROAD S. H. ROAD															

Pilot line vehicle trip report.



# COMPOUND PISTON-AND-TURBINE ENGINES

By PROFESSOR A. L. LONDON\*

**M**Y purpose is to summarize for you the compound piston-and-turbine engine development. This is a hybrid engine, the fruits of the marriage of the piston-cylinder reciprocating engine with the high rpm rotary turbine. The hybrid offsprings have assumed a variety of forms. The most important ones are shown in Fig. 1.

## The Turbocharged Engine

The turbocharged engine is the first of the family. It has already attained great technical success and wide commercial acceptance. Turbocharged aircraft engines of the spark ignition variety have been with us for more than 20 years and turbocharged 4-stroke cycle diesels have also been with us for the same period. They are in fact, standard for many diesel stationary, marine and locomotive applications and fast becoming so for tractor and heavy duty truck applications. Of the new features in the turbocharged compound engine are certain controls developed by AiResearch. Others also have developed certain accessories which also definitely improve the performance. Another new feature is the recent development of centrifugal compressor and turbine components of sufficiently high enough efficiency so that two-stroke as well as four-stroke diesels can now be successfully turbocharged. Heretofore, the turbocharging of the two-cycle engine was not possible because of (1) the higher scavenge air requirement; (2) the associated lower turbine inlet temperature; and (3) the necessity of having a turbine inlet pressure always less than the supercharger pressure. Under these circumstances, only when both turbine and compressor efficiencies are quite high, will the shaft output of the turbine maintain the compressor.

## The Turbo-Compound Engine

In this engine all work production and all work requirements for the supercharger and the piston compression stroke are fed in or taken out of the crank shaft. The load work output also comes from the crank shaft. Compare this situation to the previously considered turbocharged engine where the turbine output runs the supercharger directly without mechanical coupling of these components to the crank. The Napier Nomad engine developed in England is an example of the turbo-compound class. It is a 12-cylinder, two-stroke, loop scavenged 3200 hp diesel engine with a mechanically coupled axial flow compressor and turbine. It was designed specifically for air freighting aircraft use. A specific fuel consumption of better than 0.35 lbs/shp hr. has been claimed for it. The second example is the Napier Deltic engine, an 18 cylinder, two-stroke, uniflow scavenged, 5500 shp diesel designed for locomotive and marine installations. In contrast to the single crank pancake layout of the Nomad, the Deltic is an opposed piston layout with three crank shafts and the 18 cylinders in three banks of 6 each form the sides of a triangle with the flat side on top. There are a total of 36 pistons in this remarkable engine. As in the case of the Nomad, the Deltic engine has an axial flow compressor and a turbine mechanic-

ally coupled to the crank shaft. It has a specific weight of 2.5 lbs/hp in contrast to 20 lbs/hp for a locomotive or naval marine type diesel. Twenty locomotives containing these engines were recently ordered by the British Railways.

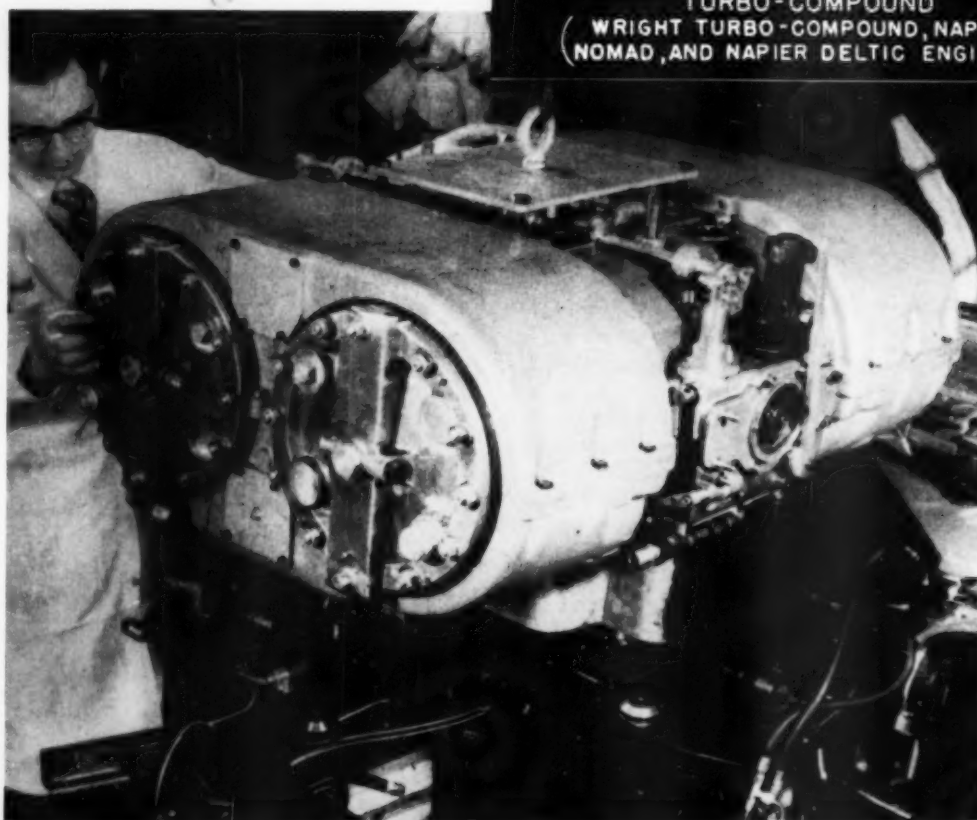
## The Crank Piston and Turbine Engine With Turbo-Power Output

Reverting to Fig. 1 the unique aspect of this engine relative to the turbocharged and turbo-compound classes is that all the engine shaft output is absorbed by the supercharger and the load is driven solely by the turbine. The one example of this class is the Orion engine developed by the General Electric Co. This development was sponsored by the U.S. Army Ordnance Corps for a tank engine. It is an air-cooled 6-cylinder opposed-piston uniflow scavenged engine with 4 crankshafts, two centrifugal compressors and associated gearing coupling them to the crankshafts, and a power turbine. One of the centrifugal compressors provides the cooling air flow at 2.1 atmospheres pressure the other compressor provides the engine air flow at roughly 2.3 atmospheres pressure. The exhaust from the cylinders combines with the cooling air flow at a pressure of about 1.8 atmosphere and then exhausts through the turbine.

## Free-Piston-and-Turbine Engine With Turbo-Power Output

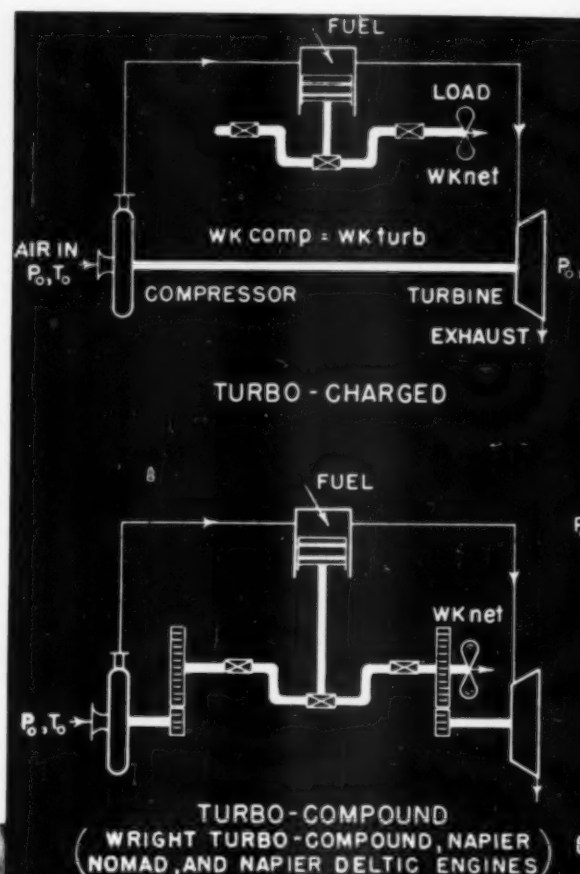
Again reverting to Fig. 1 it is seen that thermodynamically this class of engine is identical to the previously considered crank-piston-and-turbine engine with turbo-power output. All the piston engine work is absorbed by the compressor and the power turbine is connected only to the load.

GM Hyprex GMR 4-4 engine. Rated 250 shp at 4:1 supercharge, it has a potential of 500 shp at 6:1.



Mechanically however, there is a great difference. The compressor is a piston type rather than a centrifugal or axial flow type. In consequence the compressor piston can be directly driven by the engine piston without gearing and even without a crank shaft. The Ford unit of approximately

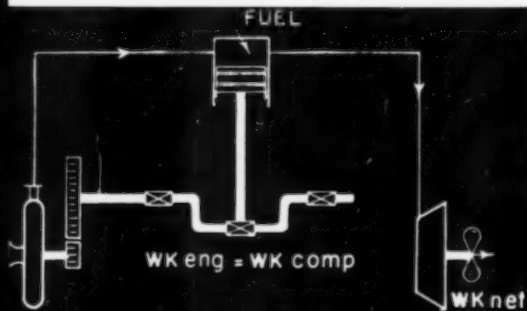
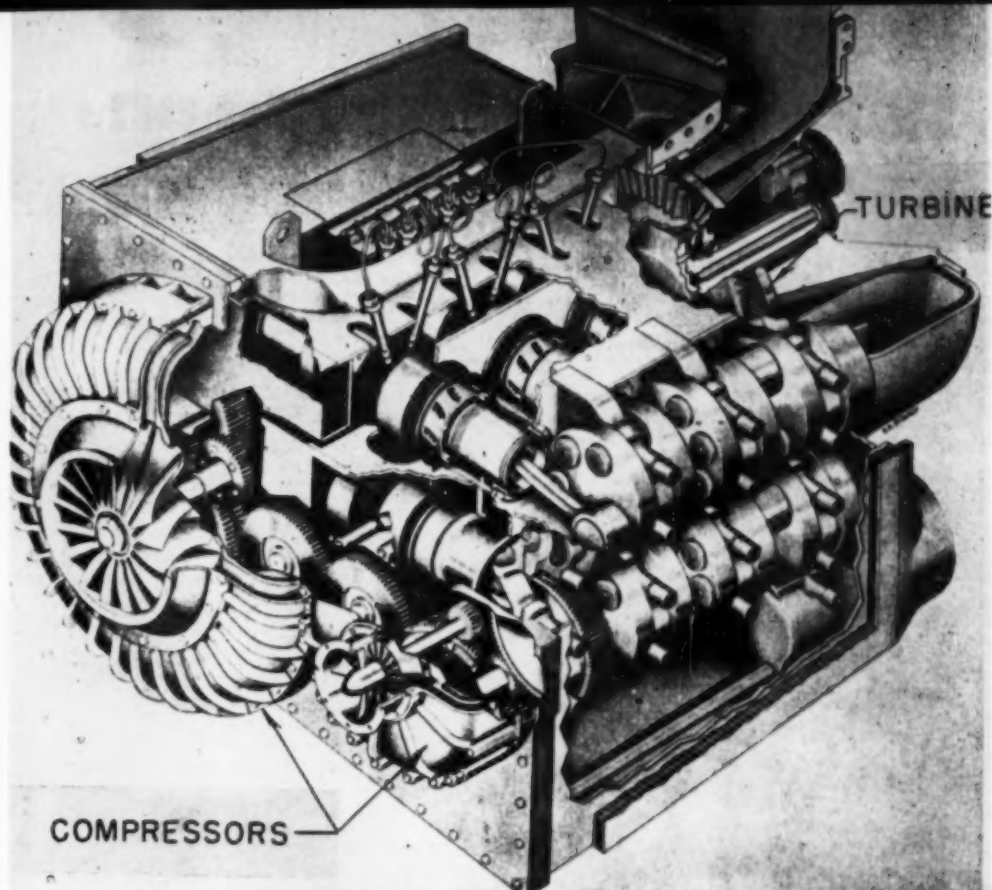
\*Department of Mechanical Engineering, Stanford University, Stanford, Calif. This is an abstract from ASME paper 58A16F of 1958 Gas Turbine Progress Report.



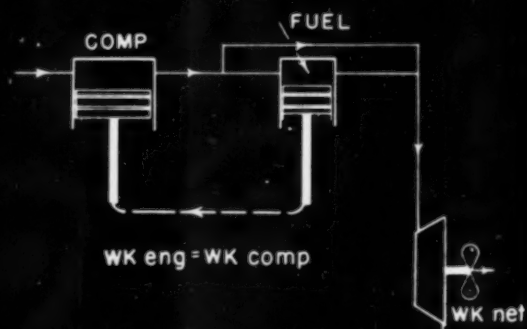


General Electric's Orion Rigel engine. With two centrifugal compressors and one-stage axial-flow power-turbine, this unit is rated 600 shp.

150 hp (potential) was installed in a tractor and demonstrated in Detroit about a year ago. General Motors also has an automotive type unit under development, the Hyprex GMR 4-4 engine is the siamese twin coupling of two cylinders to provide a common scavenge space housing. The rating of this engine is 250 hp at 4 atmospheres. The 1000 hp Sigma model GS-34 represents 25 years of development effort on the part of Rault de Pascara, the inventor of the free-piston engine concept, R. Huber the Technical Director of SEME, the design organization, and Sigma, the manufacturing organization. The successful commercial application of 90 GS-34 units in marine, central station,



CRANK - PISTON-AND - TURBINE  
ENGINE WITH TURBO-POWER OUTPUT  
(ORION ENGINE)

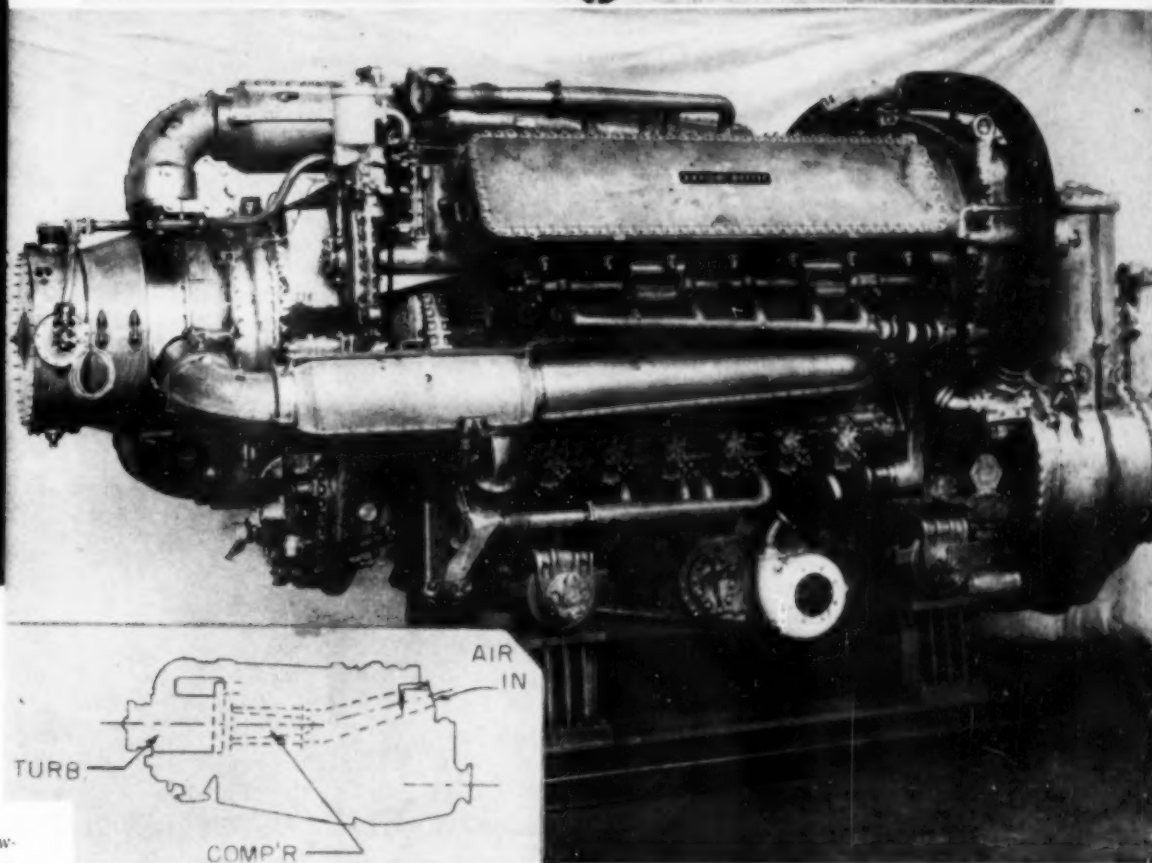


FREE - PISTON-AND - TURBINE  
ENGINE WITH TURBO-POWER OUTPUT  
(SIGMA GS-34)

Figure 1—Family of compound piston-and-turbine engines.

Napier Deltic engine rated 5500 shp at 2000 rpm. Unit has opposed piston design with 18 cylinders in three banks of six each.

pumping station, locomotive, and industrial power service more than any other factor has stimulated the free-piston development in this country. GM has a cooperative arrangement with Sigma and the Hyprex unit was designed by SEME under Dr. Huber's direction. Another product of this arrangement is the model GM-14. These units are a direct out-growth of the Sigma GS-34 design with improvements conceived by GM as a result of an extensive test program. They were built by the Cleveland Diesel Division and six of these units are installed on the *William Patterson*.



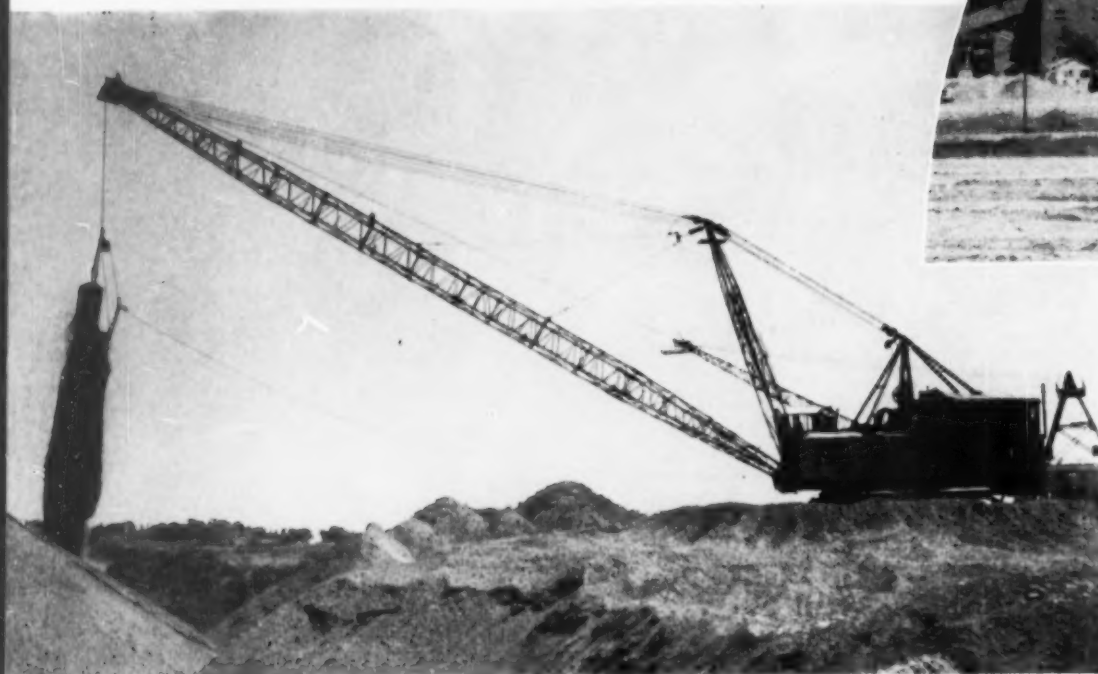
These engines operate successfully on residual fuel oil but must be started and stopped with a 15 min. distillate fuel run.

The following advantages in principle for the free-piston type compound engine relative to the other types (1) mechanical simplicity and (2) fluid coupling to a free power turbine making for excellent torque-speed characteristics and virtually immediate throttle response. The two disad-

vantages, in principle, are: (1) Light load matching of the plus characteristics of piston and turbine engines is difficult to achieve without resorting to wasteful throttling. (2) The engine cylinder should operate at a supercharged pressure greater than 3.5 atmospheres in order to have a fuel economy competitive with a conventional diesel. In turn high supercharge brings the difficult heat problems associated with all highly supercharged piston engines.

# MIGHTY MUSCLES FOR AGGREGATE PRODUCTION

By JIM BROWN\*



Working side by side at the Oxford plant of American Aggregates are two Page draglines of 5 cu. yd. and 7 cu. yd. capacity.

One of 17 diesel-electric locomotives which were converted by American Aggregates from old interurban trolley freight cars. This unit was photographed while loading cars for a shuttle run at the Greenoak (Brighton) Mich. plant.



ANYTHING more than a casual glance as you pass through the plant of American Aggregates Corp. on route M 24 north of Oxford, Mich. will give you the impression that here indeed is something big in the line of sand, gravel and crushed stone production. Small sand and gravel pits with a dredge, drag-line or shovel-and-conveyor-to-screening plant set-up dot the countryside wherever usable deposits of material are to be found. Many of us are accustomed to seeing them and to realizing that these are in the overall view a good market for diesel engines. However, when you pass right through an operation of this nature which has around 1000 acres in production or under lease you tend to "sit up and take notice." Little did we realize, however, when we made our first exploratory call at this Oxford plant of American Aggregates Corporation that we were to get a glimpse through the door at a far greater operation than we expected—a company, in fact, that is an important factor in the aggregate field in Michigan, Indiana and Ohio and one which uses, at the last count, 164 diesel engines of at least ten different makes in its operations. In its fiscal year ending March 31, 1957 the American Aggregates Corp. sold over 141½ million tons of aggregates. This represents more than twice its

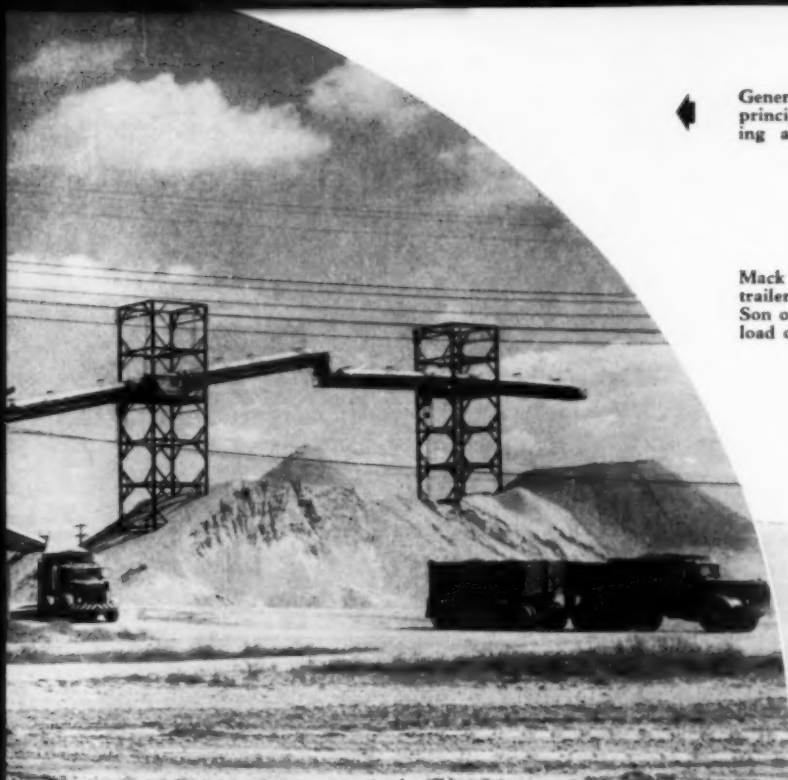
aggregate production in 1948, so it is obvious that here is a story of rapid growth. The enterprise began in 1900 at Greenville, Ohio and through all the subsequent years the corporation has continuously expanded its equipment investment and acquired additional existing plants or opened up new deposits. The book value of its common stock more than tripled between March of 1948 and March of 1958 with a commensurate increase in working capital, so it has obviously been a sound investment for its shareholders. It also maintains a

continuing policy of procuring gravel land in excess of its current rate of depletion. Its gain in property and plant value over a 10-year period has been 235 per cent.

Two of the largest American Aggregates plants are located in the Detroit area; the Oxford plant mentioned above, of about 1000 acres owned and leased, and another huge property of some 2,600 acres at Greenoak, Mich. at the edge of the Brighton Michigan State Recreation area, west of De-

\*Midwest Editor, Diesel Progress





General view of American Aggregates principal crushing, screening, classifying and truck loading facilities at Oxford.

Mack Thermodyne diesel truck and trailer owned by Harvey Beattie and Son of Detroit weighs out with a payload of nearly 31 tons of gravel from the Oxford plant.

the two American Aggregates plants we visited diesel truck-and-trailer combinations of all varieties were weighing out with their loads in a constant stream. Whereas some shipments still go out of these plants in railroad gondolas, by far the greater portion is trucked out to nearby ready-mix plants, asphalt plants, highway batch plants, etc.

As large gravel plants expand, more and more in-plant hauling is required. This was particularly noticeable at the Oxford plant which has spread right across a busy arterial highway, and at the Greenoak plant where new production was opened up on the other side of a railroad track from the screening and crushing facilities. In both instances

troit. Others are at Columbus, Dayton, Ft. Jefferson, Urbana, Fairborn and Newark, Ohio; Indianapolis and Richmond, Indiana and Kalamazoo, Mich. While some American Aggregates Corp. subsidiaries engage in other lines, including furnace slag products, contract dredging and concrete specialties, aggregates make up the lion's share of its production. Nearly 75 per cent of the aggregates produced by this company today go into the production of concrete highways, airport paving, buildings and building foundations, pre-cast concrete specialties and into bituminous concrete for highway, road, driveway and airport construction. Sand and gravel for concrete are sold in the round, natural state but aggregates for bituminous concrete require crushing equipment to arrive at finished products with the sharp edges required. In passing we would like to mention that the trans-



portation of the products of such aggregate producers to the ultimate consumer in this country also requires diesel trucks in the thousands. In

this was taken care of by constructing a tunnel and conveyor under the obstacle. In the case of the Greenoak plant, moving the washed but as yet ungraded material under the railroad and up to the screening and crushing plants requires a conveyor which is approximately 1500 ft. long. A shorter conveyor carries materials under highway M 24 to the screens and crushers at the Oxford plant. In both cases the conveyors are fed from hoppers which in turn are filled by strings of hopper type gondolas drawn by diesel industrial locomotives. As the accompanying chart will show, American Aggregates owns no less than 30 diesel locomotives and these are powered by 55 Cummins diesel engines. Some of these are standard Atlas, General Electric, Whitcomb and Porter units, but 17 of them look like nothing that was ever turned out by such companies. In fact these 17 units consist of dieselized interurban freight cars. They were converted from trolley-powered units to diesel-electric units in the American Aggregates shop (the Greenville Manufacturing Works) at Greenville, Ohio. Those of us who are old enough to remember the interurban trolley days can get a nostalgic kick out of thinking of the miles these electric-motor-trucked vehicles may once have travelled on the C. & L. E., Erie, Indiana and Oklahoma Electric lines from which they were purchased! Conversion of the units to diesel-electric started in 1939. Since then only two of them have had to

#### Condensed List Of American Aggregates Corporation's Diesels

	Units	Engines	Engine Makes
<b>CRANES, DRAGLINES, CLAMSHELLS</b>			
Bay City, Bucyrus-Erie, Lima, Link-Belt, Lorain, Koehring, Marion, Northwest, Osgood, P & H and Page.	54	56	Atlas, Buda, Caterpillar, Cummins, General Motors, International Harvester, Murphy, Page.
<b>LOCOMOTIVES</b>			
Atlas, Porter, Plymouth, General Electric, Whitcomb and American Aggregates' conversions.	30	55	Cummins LI, LRI, HBI, HS, NHRS, NHIS.
<b>GENERAL UTILITY</b>			
Caterpillar, Euclid, Lincoln Electric, Michigan, Cummins (generator set) and Cedarapids.	41	44	Caterpillar, Cummins, General Motors, Waukesha.
<b>WATER-BORNE EQUIPMENT</b>			
2 large dredges, 3 work boats, 2 auxiliary engines	5	9	Fairbanks-Morse, GM (Cleveland) Diesel, GM (Detroit) Diesel, Cummins, Atlas.
<b>Totals</b>	<b>130</b>	<b>164</b>	



be rebuilt, one of which is currently in the Greenville shop for this purpose. Most of the diesel conversions of the former trolley freight cars involved mounting either one or two Cummins L1 6 cylinder engines and generators inside the car. One that we had a chance to look over carried two Cummins L1 engines, each of which was direct-connected to a Westinghouse 300 kw 600 volt dc at 1200 rpm generator. Power to the trucks is fed through a control box in the cab. These converted trolleys are rated at 50, 60, 65 and 70 tons with one L1 engine in the 50 ton models, two L1 engines in the 60-tonners and two Cummins L1 engines in the 65 and 70 ton locomotives. Judging from their longevity and the length of service without rebuilding it would appear that these units have been a canny investment for American Aggregates.

As might be expected, another of the largest usages of diesel engines by American Aggregates is in the form of clamshell, dragline and combination clamshell or dragline cranes. Busy at stripping overburden, loading gondolas, stockpiling and binning loose material for the company are 54 of these units, involving the use of 56 diesel engines. Sizes of these excavators range from  $\frac{3}{4}$  yd. to 9 yd. capacity; the makes include Marion, Bucyrus-Erie, Lima, Lorain, Koehring, Osgood, Northwest, P.&H., Bay City, Link Belt and Page, with Buda (now Allis Chalmers), Atlas, Cummins, General Motors, Murphy, Caterpillar, International Harvester and Page diesel engines. A third category



➤ A G. E. diesel industrial locomotive is here unloading four ore cars of bank run materials into a hopper which is emptied by a conveyor at the Oxford plant.

◀ Some of the general utility diesel equipment operated by American Aggregates at Oxford: A Northwest model 41 clamshell crane, a Euclid rear-dump truck and a Bucyrus-Erie 50B dragline.



of the diesel equipment used by American Aggregates includes a number of specialized units used in stripping overburden, in cleanup work around the yards and draglines, in road maintenance, on an occasional truck-loading job and for short hauls when accumulating stock-piles of graded gravel must be moved from one location to another. These general utility units listed by American Aggregates include 11 front-end loaders with Waukesha, GM and Cummins engines; 14 Caterpillar D6 bulldozers; 13 Euclid trucks with Cummins and GM diesels; 1 Euclid TS24 scraper with 2 GM 6-110 engines; 2 Lincoln welders with GM diesel 2-71 engines and a 25 kw generator set with

a Cummins H engine. They also operate a Cedarapids portable crushing plant powered by a Caterpillar D 8800. Total in this group—41 units: 44 diesel engines.

Water-borne diesels used by American Aggregates include one Greenville Manufacturing Co. work boat at Greenoak, Mich. (powered by a Cummins H1B4) and several other units operated by their subsidiary the Grant Contracting Co. The latter consist of a 1600 hp (38D8 $\frac{1}{2}$ ) Fairbanks-Morse dredge engine and a 1200 hp 567C General Motors dredge engine; two workboats using four Cummins NHRSM engines, one 275 hp Atlas auxiliary

and one GM 6-71 auxiliary engine. Other than the two dredges for river work mentioned above, the American Aggregates dredges (as well as most of their conveyor equipment) depend upon public utilities for power. But to get rid of the overburden and to get the materials on the way to the plants, stockpiled and into the yard bins for delivery to the waiting diesel trucks obviously takes a lot of diesel power as well. Even to maintain this varied diesel equipment and keep it all in good running condition must be a whale of a job and well deserving of a story in itself. We are grateful to the managers of the Oxford and Greenoak plants, to Mr. R. S. Evans, Assistant District Manager in the state of Michigan; to Mr. L. E. Blanchard, Vice President of Operations and Mr. Luke Young, Superintendent of Diesel Equipment in Greenville, Ohio for their fine cooperation in making this story possible.

# MAINE TO ALASKA WITHOUT UNLOADING

By W. L. BODE

**T**HE Alaska "Welcome Wagon," containing 20,000 lbs. of gifts from the state of Maine to the new state of Alaska, passed through Los Angeles early last month. The Cummins-powered rig was sponsored by the Maine Truck Owners Association in cooperation with Cummins Engine Co., Inc., of Columbus Ind.; Diamond T Motor Truck Co., Inc., Chicago; the Dorsey Trailer Co. of Elba, Ala.; and nine other manufacturers. Among the over 200 gifts loaded into the big trailer are snow shoes, frozen lobster stew, clam chowder, moccasins and other Maine specialties, given as a symbol of welcome and friendship from the most north-easterly state to the most north-

"Knights of the Highway" Leland E. Weeks and Richard Pierce use Los Angeles stop to check out the Cummins diesel engine which powers their Maine to Alaska "Welcome Wagon."



Cummins-powered "Welcome Wagon", bearing over 200 gifts from the state of Maine to the new state of Alaska, passes by the Los Angeles City Hall on its 32 state goodwill tour which wound up at the ATA convention in Miami, Nov. 16-21.

westerly state. As the unit crossed the country, it was scheduled for stops at various Cummins headquarters; after its servicing at Los Angeles' Cummins Service & Sales, the "Welcome Wagon" posed before the Los Angeles City Hall. Drivers of the rig, Leland E. Weeks, of Sanborn's Motor Express, Inc., and Richard Pierce, Merrill Transport Co., have a combined record of more than 3½ million accident-free miles. Their schedule called for arrival in Anchorage, Alaska on October 23. In Anchorage, the contents of the "Welcome Wagon" will be presented to the All-Alaskan Chamber of Commerce Convention. After the presentation, the rig returned to the American Trucking Association Convention in Miami, Fla., which opened November 16, after completion of a continent-girdling tour of 13,176 miles.



# TWO NEW ONES WITH VOLVO MARINE DIESELS

**Motor Yacht *Anne* and Skiff *Determined* Are New to  
West Coast and Both Are Unique in Their Class.**

By JAMES JOSEPH

**T**HE sleek, ketch-rigged motor yacht *Anne*, on a practice run near Newport Beach, Calif., and the wide-beamed commercial fishing skiff *Determined*, on trials near San Pedro, Calif., have more in common than you might imagine. Both are powered by Volvo marine diesels. And both, for their marine class, are unique. The skiff *Determined*, with a beam more than half as wide as her length (beam, 14-ft; length, 26-ft) is a rare breed of boat: a net tender which, capable of toting fully 50-tons of fish, is perhaps the most powerful (and largest propped) tender working with the Pacific commercial fishing fleet.

The 40-ft, motor-sail yacht *Anne*, owned by Santa Barbara's Quenten Richards, has been acclaimed by Pacific yachtsmen as "the ketch with the auxiliary engine you can't hear . . . or feel." The versatile Volvo marine diesel thus scores twice with Pacific boatmen . . . as both a workhorse in commercial fishing and a nearly silent auxiliary in pleasure cruising. The skiff may well herald a switch from gasoline-powered net tenders to diesel. Explains her owner-skipper, Norman Mezin, "most of the several hundred skiffs which tend

nets for commercial purse seiners working off the Pacific Coast are gasoline-powered. Frankly, we've been looking for more power and more depend-



Skiff *Determined* during trial run.

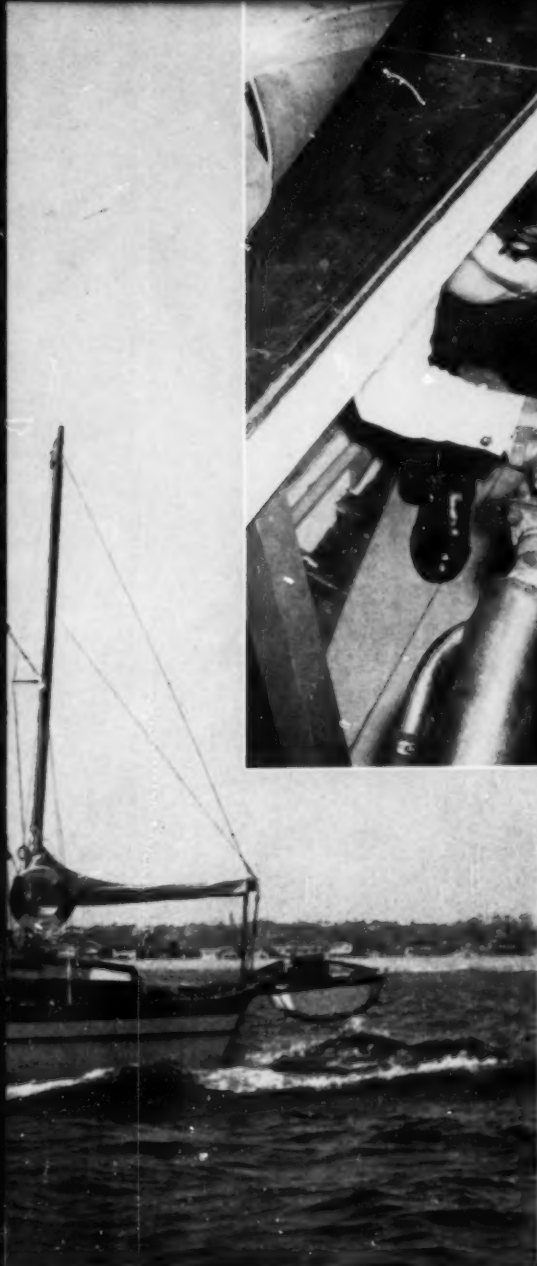


ability. And in the Volvo MD-47, we think we've found the ideal combination."

A skiff's power requirements are prodigious. Not only must it often work in choppy waters, but must take aboard upwards of 50-ton of fish at one netting. Designed to be shipped aboard a purse seiner (length, about 120-ft overall), the skiff, once waterborne as a net tender, must withstand terrific punishment. The larger boat lays out more than 400 fathoms of nylon net . . . and the skiff hauls it in. The hauling, which puts most of the weight on the skiff's starboard, calls for a craft which is both rock-stable and powerful. At stake is not only a netfull of fish which may be worth upwards of \$2000, but a net valued at more than \$50,000. Wide-beamed, the *Determined* mounts a Volvo MD-47 amidships, and set on 4x8s which are inclined some 15-degrees aft so that the skiff's 24x18-inch bronze wheel, largest propeller ever used on a Pacific fishing skiff, clears the craft's keel.

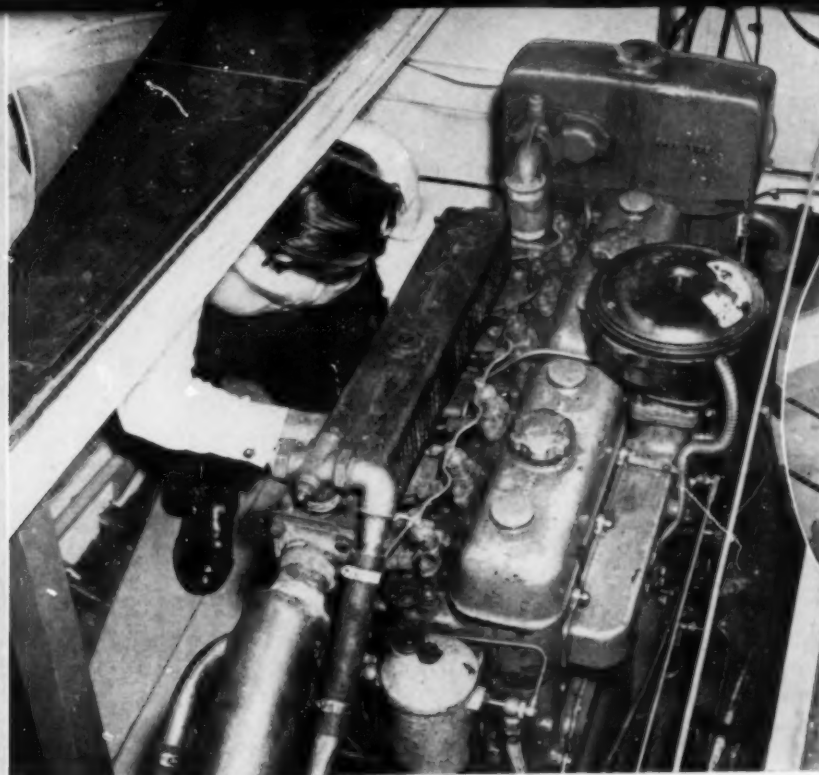
The engine, working thru a 3:1 Snow & Nabstedt reduction gear, not only drives the prop but also





simultaneously powers a winch (which hauls the net) and a bilge pump. Both of these auxiliary take-offs are chain-driven from the engine's front. Winching power is taken off the engine as a 3:1 chain drive which in turn operates thru a 5:1 Foote gear box. The power take-off is via a clutch-type Conax unit, manually operated.

Powered by the 82 bhp at 2500 rpm Volvo MD-47, the skiff can do about 7 knots. Besides tending net, it also can tow the mother ship. Fueling the 6-cylinder engine (its bore 3.75-inches, stroke 4.33-inches) are two interconnected tanks (a total 100-gallons) mounted at the stern, giving the craft extended operational range. Tho the skiff is perhaps the most stable working platform afloat (for its size), there's always the possibility that it may overturn (since its starboard is heavily overloaded by the net) or that it may be swamped. Flotation is inherent in its wide-beamed design and all wooden construction (with exception of metal runners—skegs—which prevent the net from fouling the prop). Thus, tho it mounts a diesel engine, and tho buoyed by no air tanks, the skiff will float



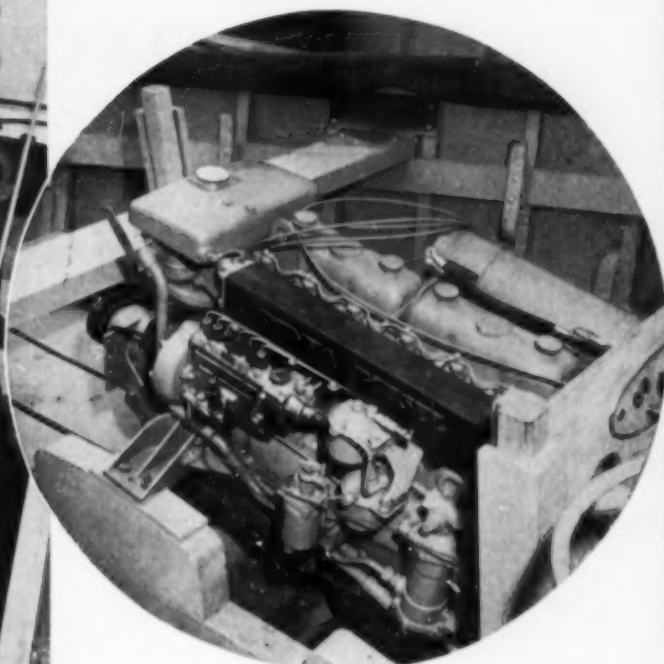
Volvo MD-67, which furnishes the *Anne* with auxiliary power, is housed midships, beneath convertible cockpit. Engine drives prop, bilge pump and generator. Note, left, the jacketed exhaust manifold, which is sea-water cooled.

Ketch *Anne* underway.

even when swamped. This requirement for flotation was one reason for selection of the lightweight (1540-lb) MD-47, which comes close to matching the weight of less powerful gasoline marine engines.

Builders of the *Determined*, Andrew and John Mardesich, whose Mardesich Cabinet & Boat Works has in the past ten years turned out more than 50 skiffs, believe that this, their newest, will prove itself the most dependable to date. "We're betting," says Andrew Mardesich, "on her MD-47." Meantime, Newport Beach, Calif. yachtsmen are hailing the newest foreign-built addition to the Pacific pleasure fleet—the 40-ft Volvo-powered *Anne*, as the "yacht with the motor you can't hear . . . or feel."

The *Anne*, with an 11'4" beam, sleeping four and carrying some 750 sq. ft. of sail, was custom built in Sweden by Harry Hallberg and shipped to the West Coast aboard a freighter. More interesting to yachtsmen than her sleek lines and teak decks, however, is the Volvo MD-67 marine diesel concealed beneath the deck of her semi-enclosed cockpit, lying midships between forward and aft cabins. For the engine is proving perhaps the quietest ever installed in a yacht. "And," says one boating enthusiast, "what pleasure boaters want is an engine that can be seen . . . but not heard." Actually, tho the 6-cylinder, direct-injection, 4-stroke engine (with a 4.12-inch bore, a stroke of 5.12-inches) is conventionally mounted, the under-deck engine compartment sound-proofed (as is common marine practice), the engine's inherently



Inclined engine mount for skiff *Determined* . . . slopes 15 degrees so prop clears keel.

smooth running is the prime noise reducing factor. The MD-67 is directly coupled thru a Twin-Disc clutch and 1.96:1 reduction gear to a 29x25-inch bronze wheel. The connecting shaft is monel. In this heavy boat installation (the *Anne* grosses 15-tons), the engine is rated 103 bhp at 2400 rpm. Additionally, a double-belted power take-off at the engine's forward end drives a 50 gpm bilge pump and a heavy-duty 24-volt Robert Bosch dc generator. A 24-volt starter motor (Bosch) works off the *Anne's* four 6-volt Tudor batteries. Ship's power runs a 24-volt Bock refrigeration compressor as well as general lighting. Carried in the engine space are two fuel tanks with a total 190-gallon capacity. The engine's cooling system uses both fresh and salt water. Fresh water is forced by a centrifugal pump through the water channels in the cylinder block, cylinder head and exhaust manifold. Circulation is controlled by two thermostats fitted to the cooling water tank. At a predetermined temperature, thermostats close and water is by-passed directly to the pump without passing thru the heat exchanger (which is salt-water cooled). Thru this arrangement, the engine quickly reaches its working temperature (165-170° F). The system has capacity for about two gallons of fresh water which is tanked over the engine's forward end.

Sea water, sucked from the bilges, cools heat exchangers, oil cooler and reduction gear. By means of a 3-way cock, used sea water is either fed to the exhaust or put overboard. The *Anne*—built in Sweden—joined the Pacific yachting fleet in August, this year. On runs in near-shore waters, she has logged more than 9 knots. Smooth running is attributed to the Volvo's precisely dimensioned and balanced parts which, combined with the crankshaft's vibration dampener, reduce both noise and vibration.

## DIESEL-ELECTRIC UNITS FOR DEFENSE

**M**ULTI-PURPOSE power for defense is supplied to all branches of the United States Armed Forces by Stewart & Stevenson Services, Inc., of Houston, Texas, one of the world's largest distributors of diesel engines. Stewart & Stevenson diesel-electric units supply power to the majority of U.S. Army Nike bases and to Jupiter, Redstone and other guided missile sites. The precise power of these expertly engineered units is used to test, raise, fire, track and guide the missiles.

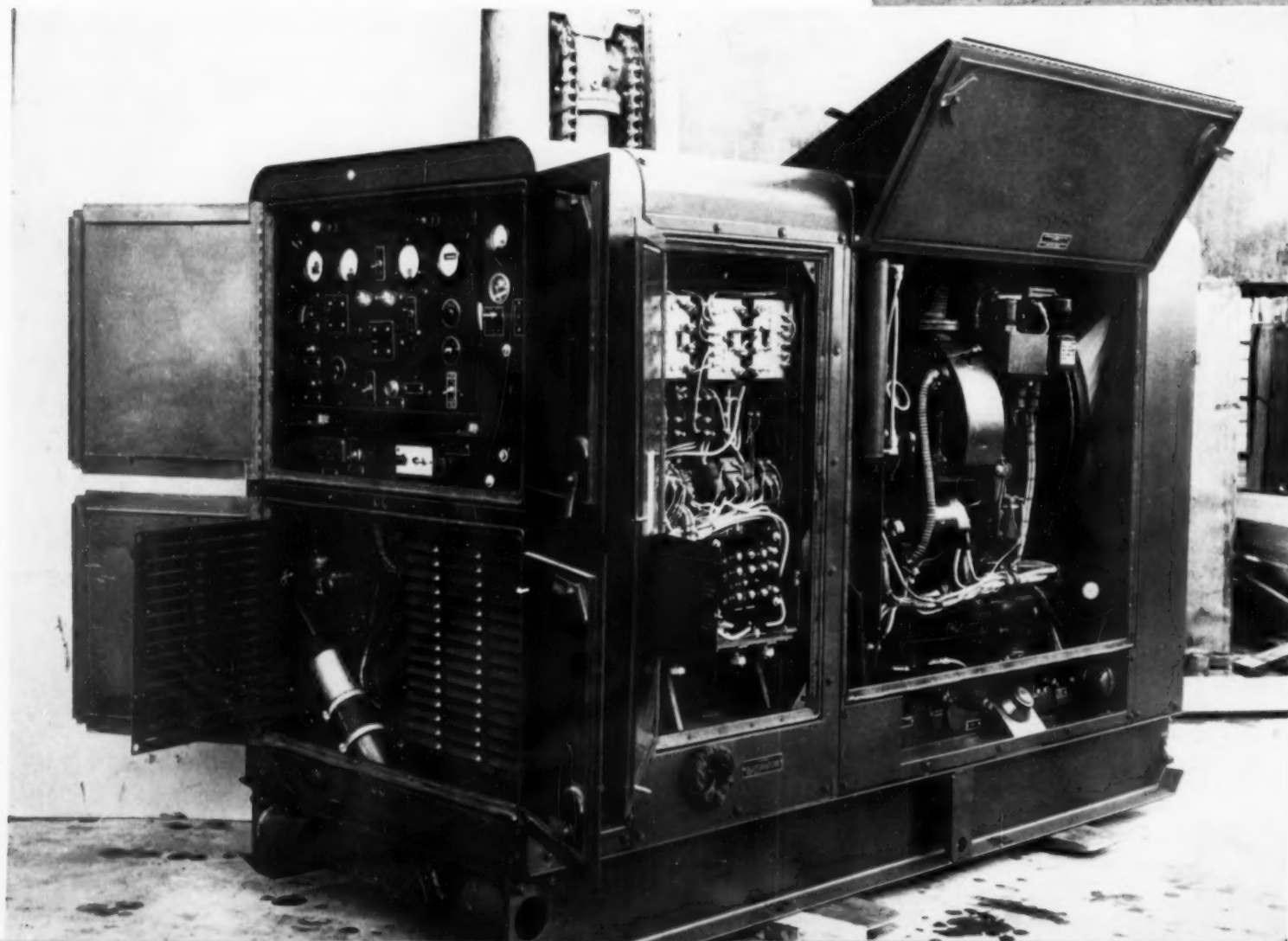
Electrical power for missile systems required the ultimate in precise regulation. These units are equipped with low transient reactance to reduce voltage dips on motor starting, low negative sequence impedance to improve voltage balance when unit is subject to single phase unbalance, and a main field regulation and exciter system to facilitate faster recovery of voltage dips. Units are completely climatized and can be truck, trailer or skid mounted for increased mobility.

General Motors Diesel Engines are used with the generators in order to give standardized high performance and ease of parts replacement and maintenance. GM diesels operate on a variety of fuels

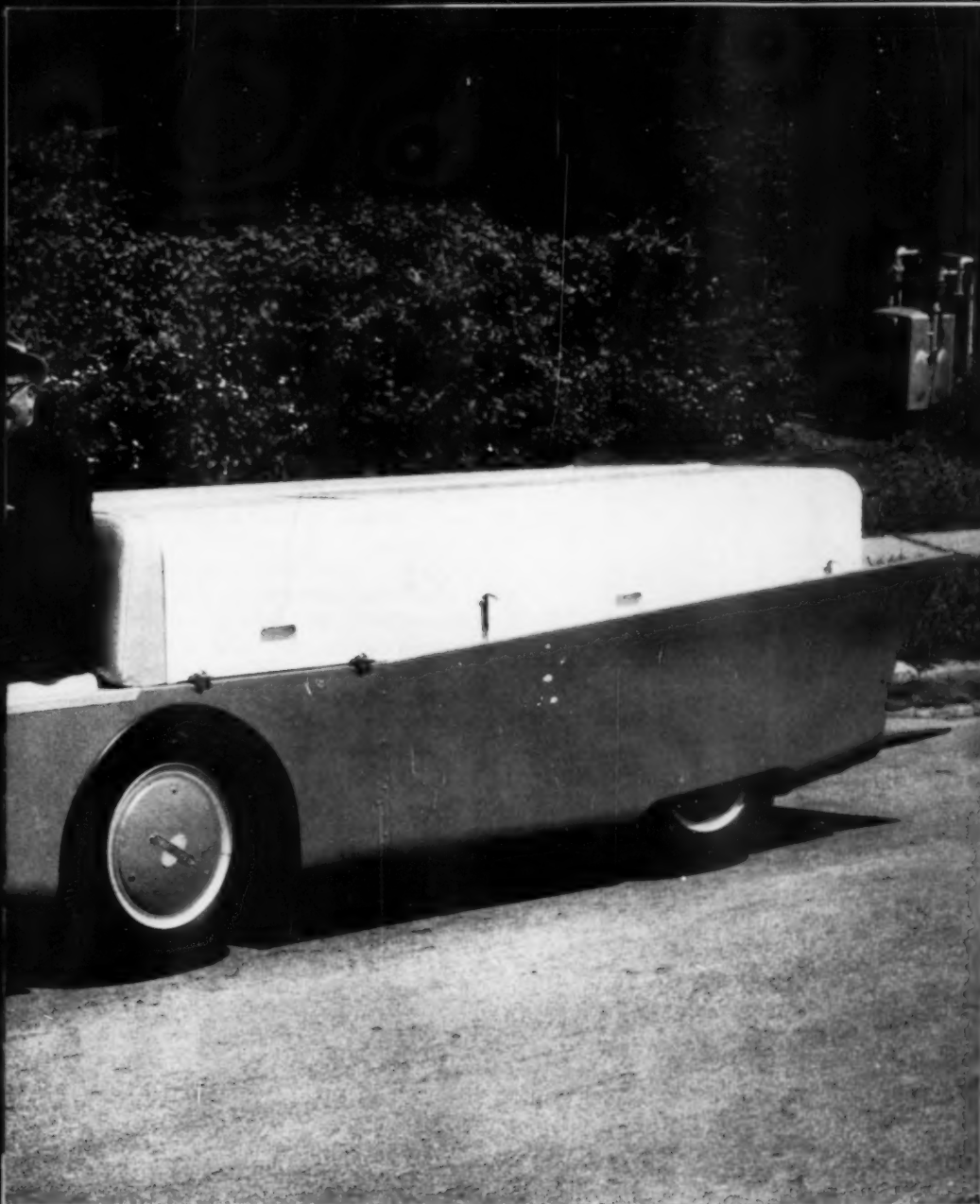
including diesel fuel, furnace oil, kerosene and jet fuel. Stewart & Stevenson diesel-electric power plants are also used in the Navy's missile program, Air Force missile program and as ground support units for jet and conventional aircraft.

In addition to the missile uses, all branches of the armed forces both at home and abroad utilize Stewart & Stevenson climatized mobile and stationary power units in practically every phase of military operations. The durability and dependability of these diesel-electric units makes them particularly adaptable as power sources for remote radar outposts and front line field locations. The excellent reputation gained by Stewart & Stevenson in supplying defense power during World War II is being enhanced daily by the dependable high performance of thousands of diesel-electric power plants, both old and new. Units are performing such important military tasks as providing power for radar installations, communications centers, heating, lighting and cooking facilities for permanent and temporary installations, power for construction and maintenance machinery and countless other tasks that will prove invaluable to the defense of the United States.

**VERSATILE POWER**—This Combination Utility Unit is one of the newest developments of Stewart & Stevenson Services, Inc. for the service of jet aircraft. However, the self-propelled unit is also applicable in the oil industry and for general industrial purposes. Here, controls are tried by Ross Stewart, Stewart & Stevenson Board Chairman.







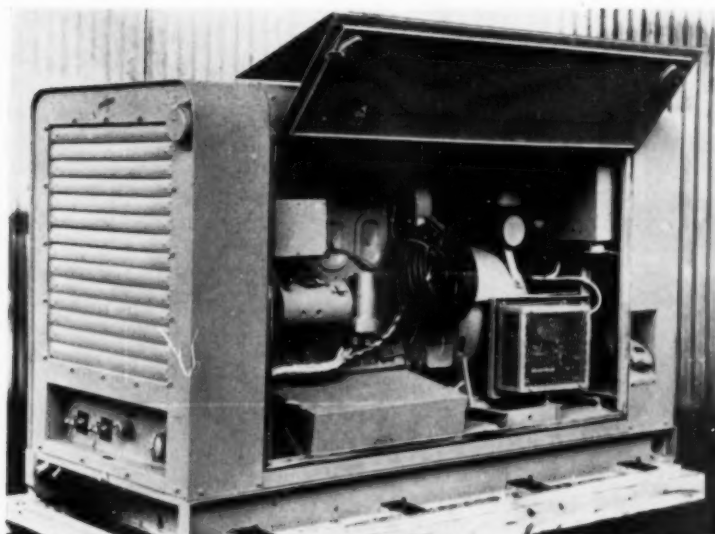
◀ **FOR THE NIKES**—Here is a 45 kw Precise Power Stewart & Stevenson generator set that is providing power at Nike Ajax and Nike Hercules bases. Primary power and tracking power is provided by these units.

➡ **FOR THE JUPITERS**—This lightweight 30 kw, 400-cycle Precise Power generator set is being extensively used at Jupiter missile bases by the Armed Forces.



▲ **ATOMIC TESTS**—A soldier passes Stewart & Stevenson generator sets in Nevada on return from a work detail. The Model W-GD-3012 set was used to furnish power for troop units participating in a series of atomic tests conducted by the Atomic Energy Commission and Department of Defense. Photo courtesy of U. S. Army.

➡ **FOR RADIO POWER, TOO:** This trailer-mounted generator set manufactured by Stewart & Stevenson Services, Inc. is used to power army radio equipment. The highly mobile equipment can be transported quickly even in rugged terrain.







Take Standard Oil's tug *Number 2*, for example. Formerly known as the *Port Barre*, this tug was built by the Canulette Shipbuilding Co. of New Orleans in 1941 as a V-2 tug for the U. S. Maritime Commission. During the war, it was used by the Mobile Towing & Wrecking Co. and by the Coyle Lines. The tug was moved to Seattle in April of 1946 and was purchased there by Standard Oil Co., from the War Assets Administration. The 1,000 hp 8 cylinder 4-cycle 16 in. x 20 in. diesel, built by the Enterprise Engine & Machinery Co. of San Francisco, was installed at the time Standard purchased the tug from the War Assets Administration. It is coupled by direct drive to the 7 ft. 6 in. dia. 3-blade propeller which has a 4 ft. 7 in. pitch to propel the 100 ft. long tug which weighs 325 tons, fully loaded. The 300 rpm Enterprise diesel is assisted by an auxiliary unit which is an Allis-Chalmers-Buda diesel, 6 cylinder engine which operates at 1,100 rpm. The tug, which has a mean draft, fully loaded, of 9 ft. 7 in., is operated principally in assisting vessels of the Standard Oil Co. fleet in docking and un-docking at wharves in the San Francisco Bay area, where its diesel engine provides 10 knots speed in shepherding Standard barges loaded with oil products.

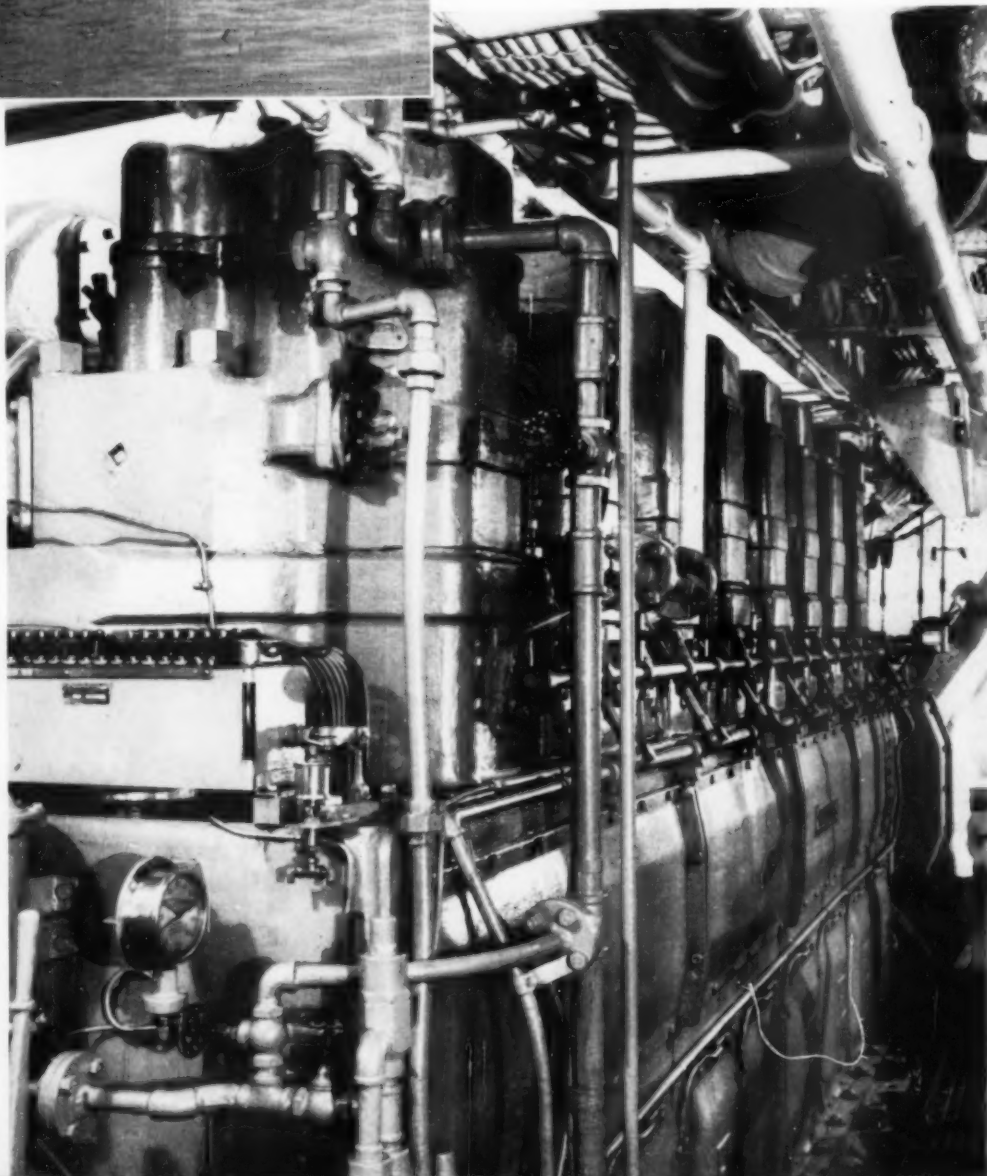
◀ The sturdy 100 ft. *Standard No. 2* is a familiar sight in the waters of San Francisco Bay.

1000 hp Enterprise marine diesel in *No. 2's* engine room. Note Manzel lubricators. ▶

## VETERAN PERFORMER

By KEN R. MACDONALD

**F**ROM Puget Sound in the far Pacific Northwest to San Francisco Bay, diesels are making it possible for the Standard Oil Company of California to quickly, safely and economically transport its great variety of petroleum products from refinery to consumer-user. Powered by reliable diesel engines, Standard's trimly efficient tugs are the busiest vessels in the company's fleet, keeping tankers and barges moving at top operating capacity. As often as five times a day, at Long Wharf, Richmond, in San Francisco Bay, or at Standard's Port Wells Terminal in Puget Sound, the sturdy little tugs can be seen putting a tanker to sea or bringing it safely to wharf. The most economical way to move oil, Standard executives agree, is on the water . . . if. That one word "if", they explain, means "efficiency". To keep a tanker idle may cost from \$100 to \$400 an hr., every hour of the day. The possible hours and minutes of idleness in a year, or even a month, could add up to a staggering sum, were it not for the efficiency of diesel power in handling the ships.



Tug is used to dock petroleum tankers such as the *F. S. Bryant* shown here.

Proof of the economy and efficiency of the diesel, Standard executives assert, is the fact that the tug operates on a 24 hour per day, 7 day a week schedule. This is accomplished by using three crews working a schedule of 16 hours on duty and 32 hours off duty. To date, the tug has had more than 10,000 hrs. of hard, vigorous operation, with only a yearly examination and no time down for repairs. Each crew consists of a captain, mate/pilot, deckhand, engineer, engine utility man and a cook, all of whom work their regular shifts in absolutely spotlessly clean quarters which are remarkable for their compactness and functional efficiency.

The tug is equipped with an Ingersoll-Rand 3 GT, 300 gpm 100 fire pump and a monitor, located atop the pilot house. This permits the *Standard #2* to perform the functions of a fire boat as well as those of a hard-working tug. Auxiliary equipment includes a 40 kw 125 volt 320 amp generator; two Ingersoll-Rand air compressors; a York model N2 oil burner; a Markey Machinery Co. electric mooring winch and a Webster-Brinkley electric capstan. A sister ship, *Standard No. 3*, is used in Puget Sound to tow a barge to various ports in that area, including the San Juan Islands. When available, it also is used for the docking of Standard Oil Co. tankers.



## NEW SERIES OF MARINE GENERATING SETS

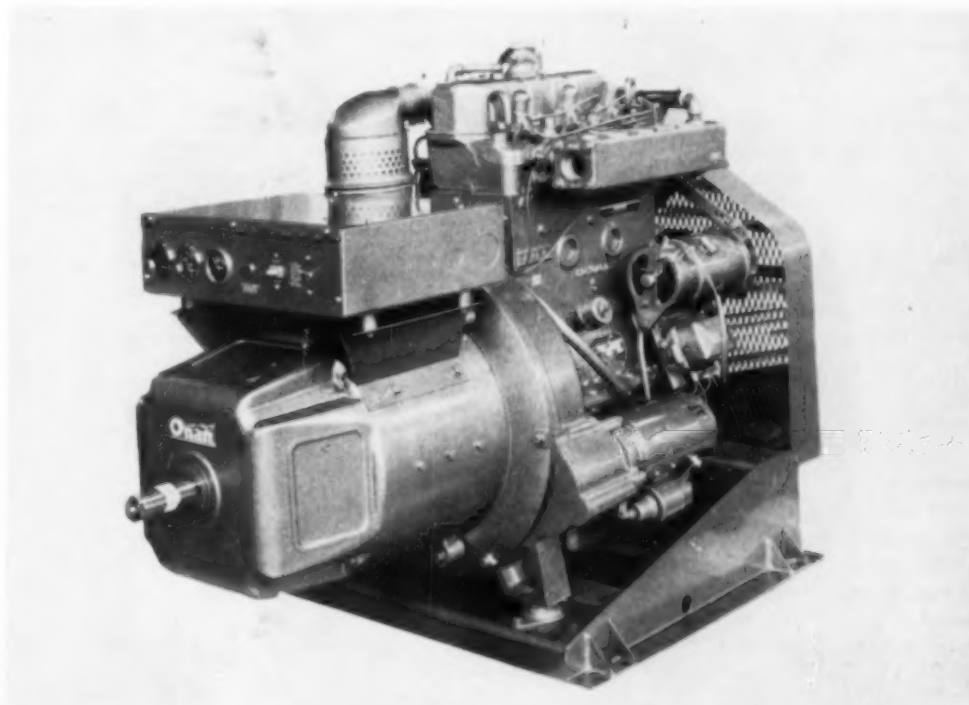
**A** NEW series of water-cooled, diesel-driven, marine electric generating plants is announced by D. W. Onan & Sons Inc. Designated series MDZB, these generating plants are available in either 10 or 15 kw ac size ranges and in all standard 60- and 50-cycle voltages to 460 volts. Completely self-contained, these marine diesel generating sets will provide dependable electric power for all types of craft. They are designed and built specifically for marine use . . . with all the built-in safety features for below-deck installation. Conservatively rated, these plants have plenty of reserve power for all appliances (including air-conditioners) communications, lights and motors.

Prime mover for the new MDZB series is the heavy-duty, 3 cylinder, 37 hp, 1800 rpm, Hercules D.D. 149 engine. Standard features include a Roosa Master distributor-type, direct-injection pump with a built-in fuel transfer pump, replaceable fuel filter cartridge, hand priming pump, oil bath air cleaner and variable-speed, mechanical governor. A 12-volt battery-charging generator, with automatic charge rate regulator, is also included. Direct-connected to the Hercules engine is an inherently-regulated Onan single-ball-bearing, four-pole, revolving armature generator. A semi-flexible drive disc assures permanent alignment. The generator provides voltage regulation of plus or minus 5 per cent, with frequency regulation of 3 cycles max. The 10 kw, 60-cycle units (single-phase) are rated at unity P.F. Three-phase plants are rated at 12.5 kva at 0.8 P.F. The 50-cycle mod-

els, in 10 kw sizes, are available in the same voltages and ratings. The 15 kw models, however, while also available in these same voltages and ratings, are derated to 12.5 kw. Both models have controls installed in a self-contained, enclosed

cabinet mounted on top of the generator. These include a battery charge rate ammeter, water temperature gauge, oil pressure gauge, highwater temperature cutoff, momentary start-stop switch and output terminal block.

Onan 10 kw marine model 10 MDZB







# GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

## Industrial & Central Station Data

THE following is abstracted from one of the finest papers (by B. G. A. Skrotzki\*) in the group titled, 1958 Gas Turbine Progress Report, published by ASME.

The remarkable acceptance that gas turbines have won in five short years is shown in Fig. 1 which divides gas turbines into three commercial classes: (1) Houdry (2) Industrial and (3) Central Station.

Houdry units are separated from industrial turbines in this analysis to indicate the "maturity" of the gas-turbine concept. The first unit was installed in 1937, the later ones up to about 1945 for a total of 40 units. Most of these served through 1952, then advanced cracking methods obsoleted the old Houdry process. Today only seven of these still serve. So the first generation of commercial industrial gas turbines have served their pur-

pose profitably and have been retired by advancing technology. Fig. 1 on next page includes gas turbines installed, planned and projected in the year listed. For example, some units included for 1952 were planned for installation in 1954; unit total for 1957 include some as projected for 1960. Fig. 2 gives the number of units and total capacity in each class of service for industrial application of gas turbine units, as of the year 1957 (installed, planned and projected).

Electric power generation and natural-gas pipeline pumping have an equal number of units, but pumping has about one-third more total horsepower capacity. Oil-field repressuring uses about half as many units as applied to gas-line pumping or to power generation. But repressuring capacity equals about 85 per cent of electric generation

capacity. Oil-line pumping uses only a few less units than repressuring, but has only one-third the total capacity. Chemical processing uses a few less units than oil-line pumping; but its capacity becomes more difficult to define because sometimes the gas turbine as a unit loses its identity to become a part of the overall chemical cycle. Refinery and petrochemical units almost equal the chemical processing and the former has a total greater capacity—but again, the same difficulty in capacity definition. Blast-furnace air supply has the smallest number of applications, but the fourth largest total capacity. Miscellaneous units should be included in these classes but inadequate description barred classifying them accurately.

\*Associate Editor, *POWER*, McGraw-Hill Publishing Company, Mem. ASME.

Table 1 — Stationary Gas Turbine Power Plants — Characteristic Data

Builder	General Electric Company					Westinghouse Electric Corporation			Brown Boveri Corporation			
Capacity, kw.	5,000	10,000	16,500	21,800	27,500	3,750	8,500	16,500	2,500	6,200	20,000	27,000
Turbine temp. F	1,450	1,450	1,450	1,450	1,450	1,350	1,350	1,350	1,200	1,200	1,200	1,100
Pressure ratio	6.0	6.0	6.0	6.0	6.0	4.1	6.0	6.0	4.6	4.6	16.0	8.0
No. of shafts	1	1	1	1	2	2	1	1	1	1	2	2
Shaft speeds, 1000 rpm.	6.9	4.9	3.6	3.29		6.0	4.69	3.6	5.35	3.6	4.75/3.0	3.0/3.0
Combustor type	Multiple	Multiple	Multiple	Multiple		Multiple	Multiple	Single	Single	Single	Single	Single
Regenerator effectiveness, %	0	0	0	0		75	0	0	75	0	0	80
Fuel	G, O	G	G, O	G, O	G, O	G, O	G, O	G, O	BG	G	O	O
Compressor type, no. stages	A, 15	A	A, 15	A, 15		A, 11	A, 14	A, 15	A	A	A	A
A—Axial flow      C—Centrifugal      O—Oil BG—Blast-furnace gas      G—Natural gas      PC—Pulverized coal												
Builder	Ruston & Hornsby, Ltd.	Clark Bros. Co.	English Electric Company, Ltd.	Metropolitan-Vickers Electrical Co., Ltd.	Escher Wyss Ltd.*	John Brown & Co.*	Sulzer Brothers	Utica Division Curtiss-Wright Corporation				
Capacity, kw.	650	6,200	1,910	1,750	2,500	2,000	7,500	2800 hp				
Turbine temp. F	1,340	1,350	1,430	1,180	1,292	1,220	1,256	—				
Pressure ratio	4.1	4.25	4.8	5.0	5.38	3.6	6.6	—				
No. of shafts	2	2	2	1	1	1	1	2				
Shaft speeds, 1000 rpm.	11.5/6.0	5.0/3.6	8.25/7.0	7.0	7.0	12.75	4.25	—				
Combustor type	Single	Single	Double	Multiple	Multiple	External	Single	Multiple				
Regenerator effectiveness, %	75	0	60	0	0	90	77	0				
Fuel	O	O	O	O	O	PC	Peat	O, G				
Compressor type, no. stages	A, 13	A, 13	A-6, C	A, 14	A, 15	C, 3	A, 21	—				

\*Closed cycle, all others open.



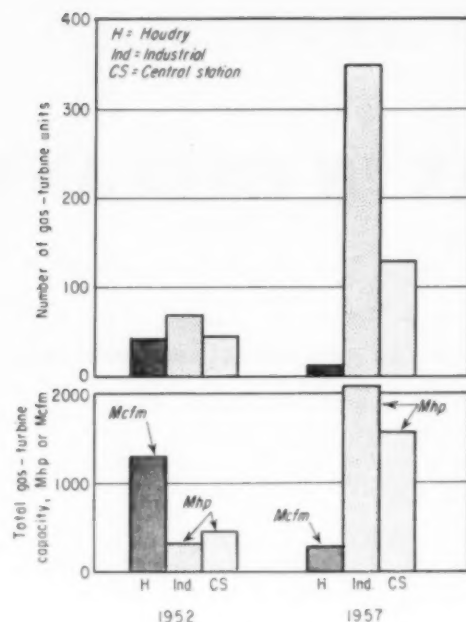


Figure 1. Comparison of number and capacity of gas turbines installed and projected on world-wide basis for years 1952 and 1957.

Fig. 3 gives us an idea of the size of gas turbine units used in each of the industrial application areas. We first show the average size of central station units (utility)—12,000 hp or 9,000 kw. For comparison, the largest unit projected—40,000 kw—will be built for the Swedish Power Board by Svenska Turbinsfabrik Aktiebolaget Ljungstrom, Sweden, for operation in 1959. Units for blast-furnace air supply have the same average size as the utility units. Industrial power generation units are only about one-third as large as the utility

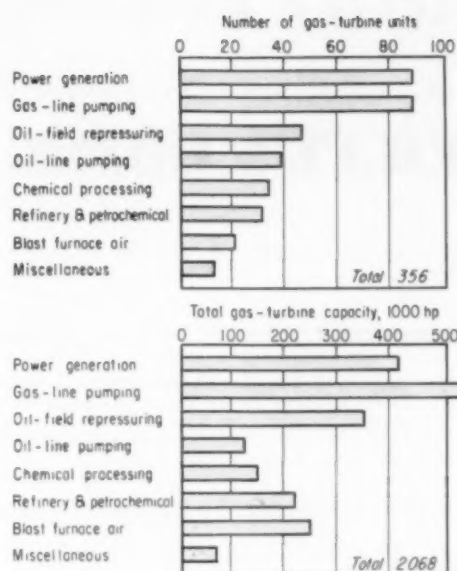


Figure 2. Planned and existing industrial gas turbines on world-wide basis for 1957 analyzed by types of application.

units—reflecting the lower individual demands on industrial electric power systems. Oil-line pumping units use the lowest average capacity of the classes listed. Other classes range in between as shown in Fig. 3. Statistics in Fig. 1, 2 and 3 should only be taken as rough indexes because figures as received from builders terminated as of different dates. Many indicated that orders were under negotiation which they were not permitted to reveal at the time—on that basis these values indicate a minimum level. In addition to the 484 commercial units

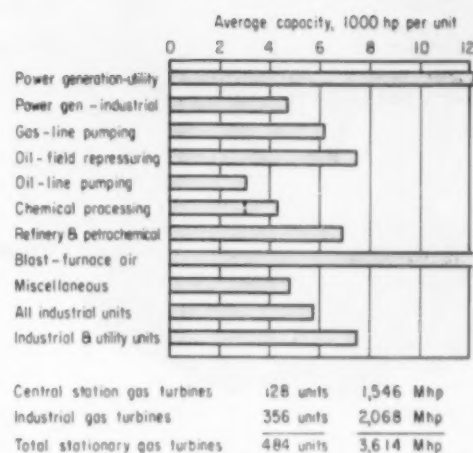


Figure 3. Average capacity of gas turbines planned and installed as of 1957 analyzed by type of application.

—industrial and utility—listed in Fig. 3 there are 36 shop and experimental units in builders' facilities with a total capacity of about 107,000 hp. The market demand for equipment reflects in the offering of "standard" models by their builders. This development has been strongly emphasized during the past five years in the gas-turbine field. Table 1 lists characteristic data on some current gas turbine offerings. Careful engineering can adapt these models or their components to the needs of a wide variety of industrial processes.

## WASTE GAS GOES TO WORK

**W**ASTE gas, normally piped away and burned, has been put to work at a gas separation station on Lake Maracaibo, Venezuela. At Superior Oil Company's flow station located almost in the center of the lake, an oil and gas mixture from approximately 12 wells within a radius of five miles is piped under natural well pressure to a gas separation station. The gas is then separated from the crude and the bulk of it is released to the atmosphere through two pipes extending 500 ft. out into the lake. Superior is putting much of this waste gas to work. Four Caterpillar D375 spark-ignition engines use the gas to drive four National Supply C-100 pumps. Two more D375's drive a fifth C-100 pump, a 75 hp water pump and two 187 KVA Electric Machinery generators. The station, typical of Lake Maracaibo oil operations, stands in 196 ft. of water. Because of the extremely corrosive action of this water, a welded aluminum structure was first set into position and steel pilings were driven through it. After the pilings were in place, the aluminum shells surrounding the steel were filled with cement. The aluminum shell was fabricated in the United States and transported to the location by barge. Present capacity of the station is about 70,000 bls./day, but this will be increased to almost 100,000 bls./day with the addition of two more pumps, coupled to two

additional Caterpillar D375 engines. Thousands of wells dot the 115 by 70 mile Lake Maracaibo which is about the size of Lake Erie. Geologists estimate the known reserve of oil in the lake at over 14 billion bls.

Two of the six Caterpillar engines that, using normally wasted gas, power the flow station.

Superior Oil's flow station stands in 196 ft. of water in the center of Lake Maracaibo.





## WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

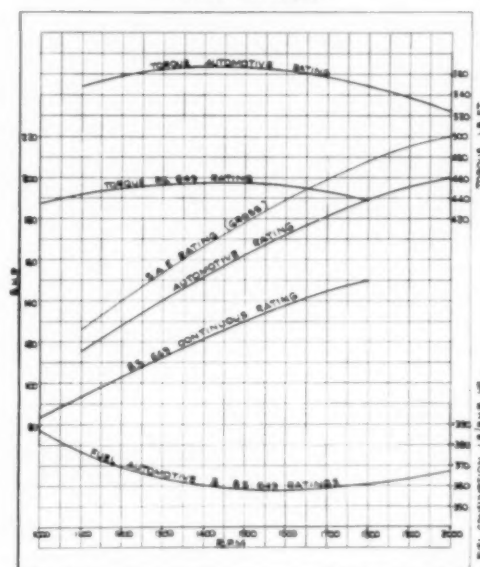
### New British Road Transport Diesels

**T**HE recent Commercial Motor Show in London provided a number of manufacturers of road transport diesel engines with the opportunity of introducing new additions to their ranges. Henry Meadows Ltd. of Wolverhampton, for example, featured two new designs, both based upon their existing and widely used 6DC630 design. One of these new units is a turbocharged version of the existing design utilizing a Holset-Schwitzer blower. The blower may be fitted either at the side or above the engine according to the installation requirements and the only other modification to the standard design found necessary for the turbocharged version, is the reduction of compression ratio from 16 to 1 to 15 to 1. The engine has a common bore and stroke of 130 mm giving a swept volume of 10.35 liters. The automotive rating at 2,000 rpm is 200 bhp for the turbocharged unit as compared with 145 bhp for the normally-aspirated version. An improved fuel consumption results from turbocharging, the full load figure for the turbocharged engine being 0.36 lbs/bhp/hr. The second new Meadows design is a long-stroke version of the 6DC630, which carries the new designation, 6DC700. This engine retains the original bore size of 130 mm but the stroke is increased to 143 mm, thus increasing the capacity to 11.4 liters. Automotive rating is 165 bhp at 2,000 rpm with a max. torque of 470 lbs./ft. at 1200 rpm.

The Daimler Co. Ltd. also introduced a turbocharged version of a well established existing engine, this being the Mark VIII version of their CD6 design. It is a four-stroke direct injection six cylinder unit with a bore of 4.5 in. and a stroke of 5.5 in., the cubic capacity being 8.6 liters. The naturally-aspirated version produces 125 bhp at 2,000 rpm and, when turbocharged, the figure is 148 bhp at the same speed. At 1800 rpm the power increase is from 118 to 135 bhp. The blower on this engine is of B.S.A. design, known as their type 100/200, carried on a twin branch exhaust manifold at the rear of the cylinder block. This form of mounting is claimed to facilitate the installation of the Daimler engine in standard applications, without making special provisions for the extra space required. Other important technical features include a cast iron monobloc cylinder block and crankcase with a nitrided steel crankshaft statically and dynamically balanced, carried in seven main bearings of 3.5 in. diameter. The connecting rods are of manganese molybdenum steel with big end bearings of 2.875 in. diameter. The low expansion alloy pistons have hemispherical combustion chambers and carry three compression rings, the top one being chromium plated and two scraper rings. The camshaft is carried in seven bearings with renewable bushes, high-up on the right-hand side of the

block. It operates CAV fuel injection equipment through a conventional valve mechanism.

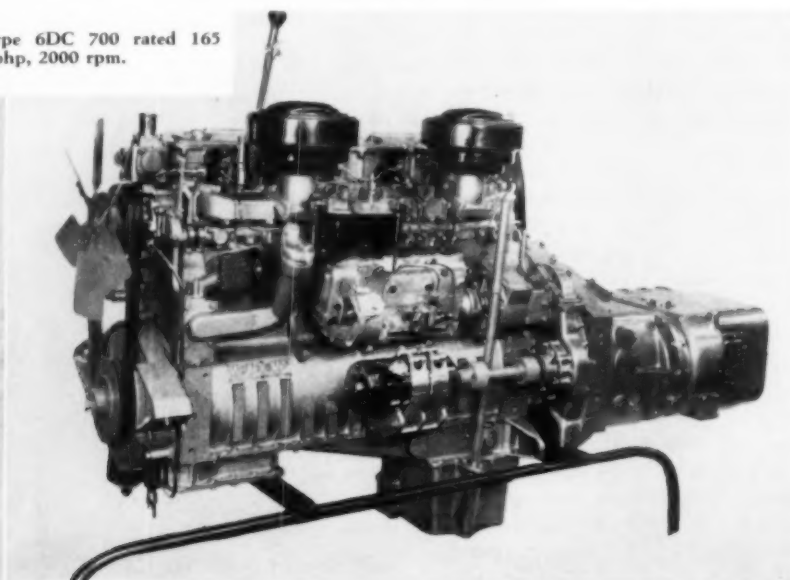
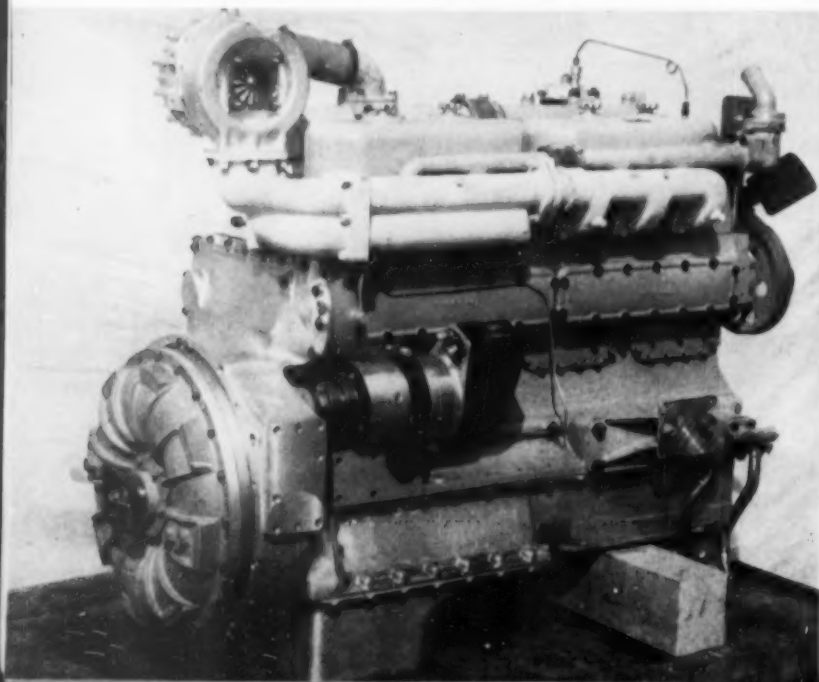
TURBO CHARGED



Performance curve of Meadows type 6DCS 630 engine.

Daimler 148 bhp Mark VIII turbocharged engine.

Meadows type 6DC 700 rated 165 bhp, 2000 rpm.





# FUEL INJECTOR COMPARATOR

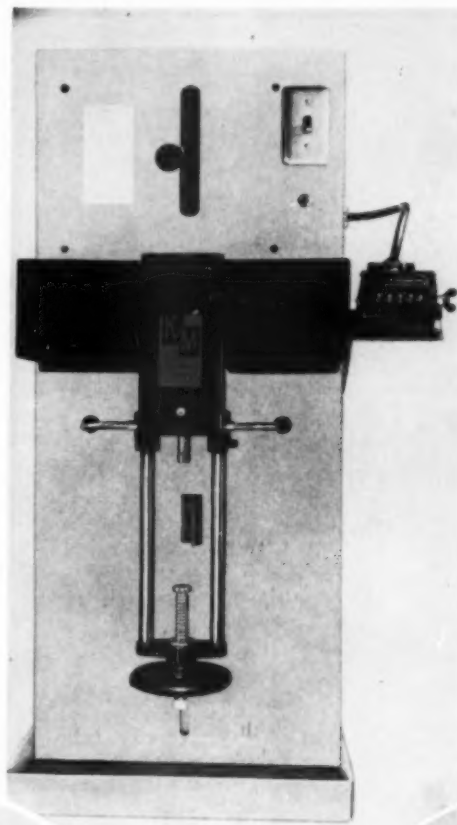
**New Equipment Designed for GM Diesels  
Subjects Injectors to Simulated Operating  
Conditions; Accurately Determines Output.**

**A** NEW procedure for testing and calibrating the GM unit-type injectors has been perfected by the Research Section of Kent-Moore Organization, Inc., of Warren, Mich., working in close collaboration with engineers of the Detroit Diesel Engine Division of General Motors. The process involves J-7509, a redesigned tester for popping, spray pattern, high and low pressure leaks, etc.; J-6868, a new injector assembly and disassembly fixture; and J-7041, a new comparator for accurately determining the output of any used, new, or rebuilt injector over a definite time cycle under simulated operating conditions.

In the redesigned J-7509 Testing and Popping Fixture, flexible hose lines are replaced by rigid tubing in order to control to very close limits the volume of fluid in the circuit. All fuel is filtered to microscopic limits in order to eliminate the greatest source of injection malfunction—dirt. A further feature is the cam-operated injector clamping fixture which applies just the right amount of pressure to properly seal the connectors of the injector with fuel supply and by-pass lines. The new J-6868 Injector Assembly Fixture provides a quick-clamping vise to hold injectors for assembly and disassembly operations in such manner that over-torquing is practically impossible. Jaws are available to fit all of the Detroit Diesel injectors.

Procedure for complete diagnosis of GM Diesel injector performance has been augmented by a new unit known as the J-7041 Injector Comparator. Just as the "proof of the pudding is in the eating," the proof of a satisfactory injector is in

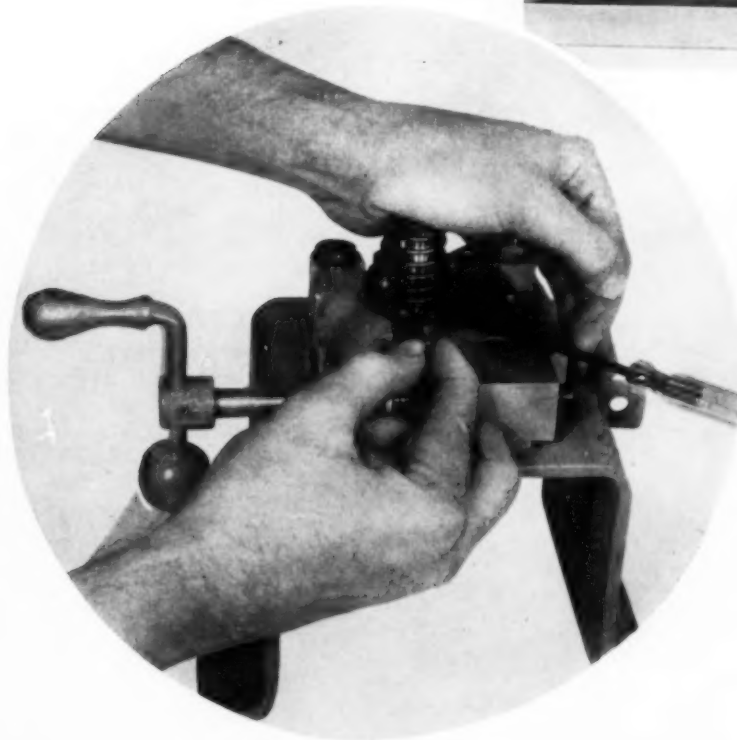
its output. This does not mean its apparent momentary performance during a series of static tests, but the cumulative effect of component tolerances with the over-all performance under simulated operating conditions. In actual operation, the Injector Comparator provides a means of clamping a used, rebuilt, or new injector in a fixture, then driving it at a fixed speed through a given number of cycles, and measuring the output in a graduate. Filtered fuel is supplied at uniform pressure approximating that supplied in actual service. A chart mounted on the face of the Comparator shows the minimum and maximum output range for each type of injector. One of the most valuable features of the Comparator is that it eliminates tear-down of a used but perfectly serviceable injector. Another is that it provides a means of adequately determining serviceability of a new or rebuilt injector before installing it in the engine. By matching up sets of injectors whose known delivery is closely comparable, a smooth-running engine is practically assured. The Comparator is, therefore, a perfect adjunct to the injector testing and popping fixture for it adds up all tiny variations in individual injectors and classifies them in one common denominator—known output.



◀ Front view of the Kent Moore Injector Comparator. Unit is 20 in. wide, 14 in. deep and has an overall height of 39 in.

J-6868 injector assembly and disassembly fixture is 8 in. wide, 6 in. deep and 10 in. high.

The new J-7509 testing and popping fixture has a width of 13 in., depth of 13 in. and a height overall of 19 in.





# DIESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

## Quality Workmanship in the Modern Service Shop

**I**N any type of Service Department, whether fleet or retail service, there is a definite value to be placed on tools and equipment to influence the quality of work performed. Such tools have a direct affect on the produce man-hours of an operation. The tools and equipment that are so classified are those that are indicative of the items used to insure a precision job. If they are not used, a high percentage of "do-over" work can be expected. A retail service operation can expect to gain very little influence over customers and can expect a resultingly low shop productivity unless it uses quality workmanship tools and equipment. By using quality workmanship tools, a new mechanic can often be brought to full production capacity within a reasonable length of time.

### Merchandising Tools And Equipment

Many tools and much of the equipment used in a well equipped service shop, while playing a major role in the quality of work performed can also be classified as merchandising items. Besides the importance of these tools in performing the actual mechanics of overhauling and rebuilding, they have a beneficial effect on the productive man-hours and labor sold by a retail operation. Tools that could be included in such a classification are those that will contribute to the overall effectiveness of the labor sold and will enable the Service Department to guarantee the end results. Many of these merchandising items can also be classified as labor-saving and quality workmanship tools and equipment. Regardless of the various classifications given to tools and equipment, they cannot be considered as merchandising items unless they are actively promoted. For example, a retail service operation using a dynamometer to run-in and test each engine overhauled may be thoroughly sold on the use of such equipment and realize the many benefits that are derived from its use. However, until the features of this equipment are used to influence customers on the quality of service available and that horsepower and performance of overhauled engines is guaranteed, the dynamometer is not being used as a merchan-

dising media. It is a known fact that customers are influenced by the tools and equipment a Service Department uses to assure them that they are receiving a full value for service purchased. The impressions made on the customer by promoting the type of equipment used will result in increased service sales volume, and a resulting increase in shop productivity.

### Care & Maintenance Of Tools & Equipment

Tools and equipment properly used and maintained will last longer than those used in a haphazard manner and carelessly maintained. Service management that takes the necessary time and effort to train shop personnel in the use and care of tools and equipment will enjoy a longer equipment life than will management who gives no thought to such matters. Furthermore, shops which have a well planned training program covering the use and care of tools and equipment can generally afford a greater variety of necessary items, and live within a planned budget. While we all recognize that if a tool is to be useable, it must be maintained, properly stored and periodically inspected. It is not uncommon to find mechanics using and caring for equipment in a manner that would make the manufacturer shudder. Much of this mis-treatment is not the fault of the mechanic but of the Shop Foreman or because a Service Manager did not make it his business to see that the mechanic was properly informed on the use and care of the equipment he is expected to use. While many Service Managers schedule regular training programs for their shop personnel to cover the use of equipment and explain in detail the equipment manufacturers' procedures for using and maintaining the equipment, there are a few who do not even allow the mechanic to see the literature or manuals supplied by the equipment manufacturer.

The alert Service Manager will not only train his staff to properly use and care for the equipment in his shop, but will provide a library which

will include literature and manuals covering all of the equipment his mechanics use. Many manufacturers will enthusiastically furnish manuals for such a library and will also assist in the training of shop personnel in the proper use and maintenance of their products. A Service Manager that does not have an organized program to see that tools and equipment are properly used and maintained can expect short equipment life and an over-burdened tool and equipment budget. This is also true of a Service Manager that maintains his own private library of tools and equipment instruction manuals and does not make such literature available for mechanics' use. Generally, a Service Manager who does not follow a planned program to see that equipment is used properly may find it extremely difficult to sell top management on the need for additional equipment that could increase the profit and productivity.

### Inspection Of Tools And Equipment

Frequent and regular inspection of tools and equipment is necessary to maintain their efficiency, and is an important responsibility. Such items are an investment that must be protected. A scheduled tool and equipment inspection set-up for specific times as determined by the equipment type and frequency of use, will result in numerous production benefits and long equipment life. For example, the valve refacing machine may require more frequent inspections than the dynamometer or welding machine. To be sure that each piece of equipment in the shop is properly maintained and inspected, it is generally advisable to delegate the responsibility to certain qualified personnel. If such a practice is followed and a strict schedule maintained, the mortality of tools and equipment will be held to an absolute minimum. A piece of equipment, unused because it is broken or in need of repair, is of no more value to the profitable operation of a service operation than a piece of junk on the scrap pile. Furthermore, unless tools and equipment remain efficient, they become a hazard to safety and a detriment to the department's operation.



GM  
DIESEL

A whole new  
concept  
in power

**all purpose power line**

(20 to 1650 H.P. IN ONLY 3 CYLINDER SIZES "V" AND "IN LINE")



# all purpose

## GM Diesel combines 8 New Basic "V" and "in-line" engines with

**T**o help industry fill its power needs, GM Diesel engineers have developed the most comprehensive power concept since they pioneered the small 2-cycle Diesel.

Using only 3 cylinder sizes, they have more than doubled the number of basic engines—vastly increased the horsepower range—yet maintained the family relationship and parts interchangeability for which GM Diesels are famous.

Each engine features the ultimate in *compactness, light weight, high efficiency, durability and inexpensive maintenance.*

Basing their design on that of the versatile and capable GM Series 71 Diesel, GM Diesel engineers have created 8 new basic "V" and "in-line" engines which will add vastly new power coverage to the present Series 71 and 110.

First, the new Series 53 Diesel—comprising four basic "V" and "in-line" engines—is a smaller, more compact version of the famous "71."

Here, at last, in the Series 53, are Diesels which cover the lower horsepower ranges as never before. They hurdle the barriers which have limited the use of Diesel power in a whole host of applications. They offer new opportunities for Diesel power to farmers, boatowners and industrial users by making available GM Diesels particularly suited to their needs. They will pay for themselves amazingly fast when they take over from gasoline engines.

Four new "V-71" engines complete the additions—widen the power range of the "in-line" 71 Series—set new standards for low weight and small size per horsepower. These "V-71"

The GM Diesel  
All-Purpose  
Power Line  
20 to 1650 H.P.  
in only 3 cylinder sizes

NON-TURBOCHARGED RATINGS



NEW

"2-53"

20 to 37 H.P.



NEW

"2-71"

38 to 67 H.P.



NEW

"3-53"

38 to 97 H.P.



NEW

"3-71"

51 to 118 H.P.



NEW

"4-53"

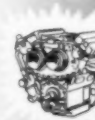
51 to 130 H.P.



NEW

"4-71"

69 to 167 H.P.



NEW

"6V-53"

76 to 195 H.P.



NEW

"6-71"

112 to 252 H.P.



# e power line

(20 to 1650 H.P. in only 3 Cylinder Sizes)

## s with its proved "Jimmy" Diesels

ur basic "V"  
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s—widen the  
standards for  
these "V-71"

engines bring far more power than ever before possible to the big brutes of the construction, mining, petroleum, logging and marine industries—up to 1650 H. P. when turbocharged.

Production has started and complete programming has been established on all new engines. Non-turbocharged engines will be available first, followed later by Turbopower models to complete the power range.

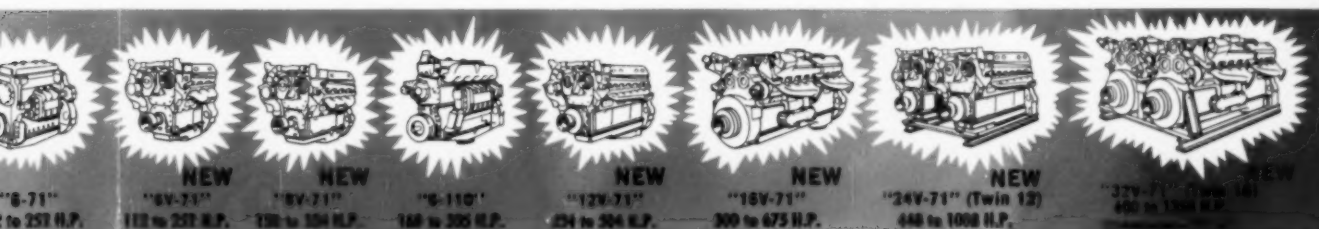
So—now more than ever before, it pays to standardize on GM Diesel power. For whatever you want a Diesel to do, there's a GM Diesel to do it for you—faster, better, at less cost. Truly, here is a whole new concept in Diesel power—the All-Purpose Power Line. Get the full story by writing GM Diesel, Detroit 28, Michigan.



# GM DIESEL

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario  
Parts and Service Worldwide



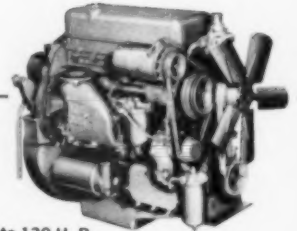
# NOW...A "JIMMY" DIESEL for every power purpose

20 to 1650 H.P. in only 3 cylinder sizes

## NEW SERIES 53

—smaller Diesels millions can use  
2, 3, 4 and V6—20 to 195 H. P.

A scaled-down version of the famous Series 71 GM 2-cycle Diesel—identical in design principles—the new 53 Series incorporates the time-proved features of patented GM unit fuel injection and uniflow blower scavenging in more compact, lightweight units. These spacesaving engines open up whole new fields of Diesel usefulness in trucks, buses, and taxicabs, in marine service, as well as in tractors, generators, loaders, lift-trucks and many other types of industrial equipment.

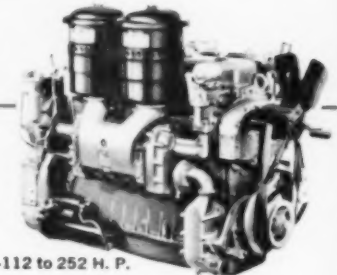


"4-53"—51 to 130 H. P.

## SERIES 71 "IN-LINE"

—the versatile, time-proved economy Diesel  
2, 3, 4, 6, Twin 4, Twin 6, Quad 6—33 to 1008 H. P.

Never, in industrial history, have there been Diesels as versatile and capable as the Series 71 GM Diesels—built in a wide range of Fan-to-Flywheel, Package Power, Torque Converter, Generator Sets, Economy truck engines and Turbopower models. And, because of GM Diesel's unique power concept—a family of engines featuring unequaled parts interchangeability—these time-proved "Jimmy" Diesels become even more valuable as key components of the GM Diesel All-Purpose Power Line. Today's "71" engines incorporate the results of 20 years' continuous improvement.

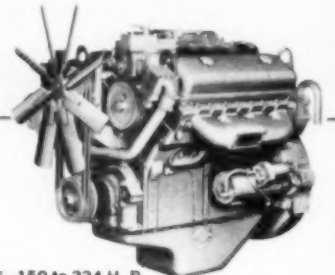


"6-71"—112 to 252 H. P.

## NEW "V-71"

—higher horsepower in smaller, more compact units  
V6, V8, V12, V16, Twin V12, Twin V16—112 to 1650\* H. P.

The new V-71 "Jimmy" Diesels are a further dramatic illustration of GM Diesel's mighty new power concept—rounding out the All-Purpose Power Line—yet retaining the GM family relationship and parts interchangeability. Here are engines destined to give you a better investment-earnings ratio than any you have ever had before. Diesels that boast the ultimate in compactness, light weight, high efficiency, durability, inexpensive maintenance and parts interchangeability.



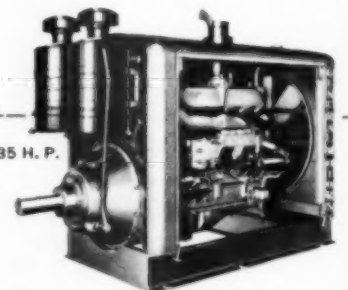
"8V-71"—150 to 334 H. P.

\*Turbopowered

## SERIES 110

—a favorite on heavy-duty jobs  
6-110 and Twin-6-110—160 to 670 H. P.

Renowned for its ability to get big jobs done faster at lower cost, the GM "6-110" has stepped in and taken over thousands of jobs for every kind of business—done those jobs as never before—greatly expanded the usefulness of Diesel power. Built in single- and multiple-engine units, the Series 110 engine is available for a wide variety of heavy-duty applications in earth-moving, oil-field, railroad and marine equipment.



"6-110"—160 to 335 H. P.

GM Diesel  
Detroit 28, Michigan  
Send me detailed information on new GM Diesel All-Purpose Power Line. I am interested in new Series 53 (.....), Series 71 "in-line" (.....), new V-71's (.....), Series-110 (.....).

NAME..... TITLE.....

COMPANY.....

STREET ADDRESS.....

CITY..... ZONE..... STATE.....

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario



# GM DIESEL

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario  
Parts and Service Worldwide

Specifications subject to change without notice.

Litho U.S.A.



# EMERGENCY POWER ESSENTIAL

By L. H. HOUCK

**W**HEREVER fast, dependable, automatic electric emergency power is required, it's the diesel-electric set that takes up the load and the responsibility. Acceptance of fully-automatic diesel-electric emergency units performing standby service all over the world, accents the reliability of this protection against power failure from storms, disasters and local current interruptions. The ability of these units to take over the load in seconds is responsible for the increasing number of diesel-electric sets being included in the plans of commercial and public buildings. While such installations are now becoming common in hospitals, the economic use of such units is being rapidly extended to other fields. Warning systems, radar nets, radio stations, pumping stations are also common users of diesel standby auxiliary power units. More unusual, perhaps, is the use of diesel-electric standby sets in large hatcheries, where an interruption in local current might cause the loss of a full crop of baby chicks or turkeys. Most unusual and less well known is the fact that most of the large gambling casinos in Nevada use diesel-electric emergency sets as insurance against an alert bandit clipping the service wires to provide a working cover of darkness. Less well known is the use in banks and financial institutions, where a power failure would cancel out its burglar alarms and vault time locks. Large freezer plants often use such units to insure a constant voltage since variations can cause heavy losses and outages are among their greatest hazards.

A typical installation is one recently completed at the new hospital at the Richards-Gebaur Air Force Base, Grandview, Mo., 10 miles south of Kansas City—a central air defense base. Here a model WKD, 1197 cu. in., 6 cylinder, Waukesha diesel-electric set was installed in a special room adjacent to the basement and under the direct

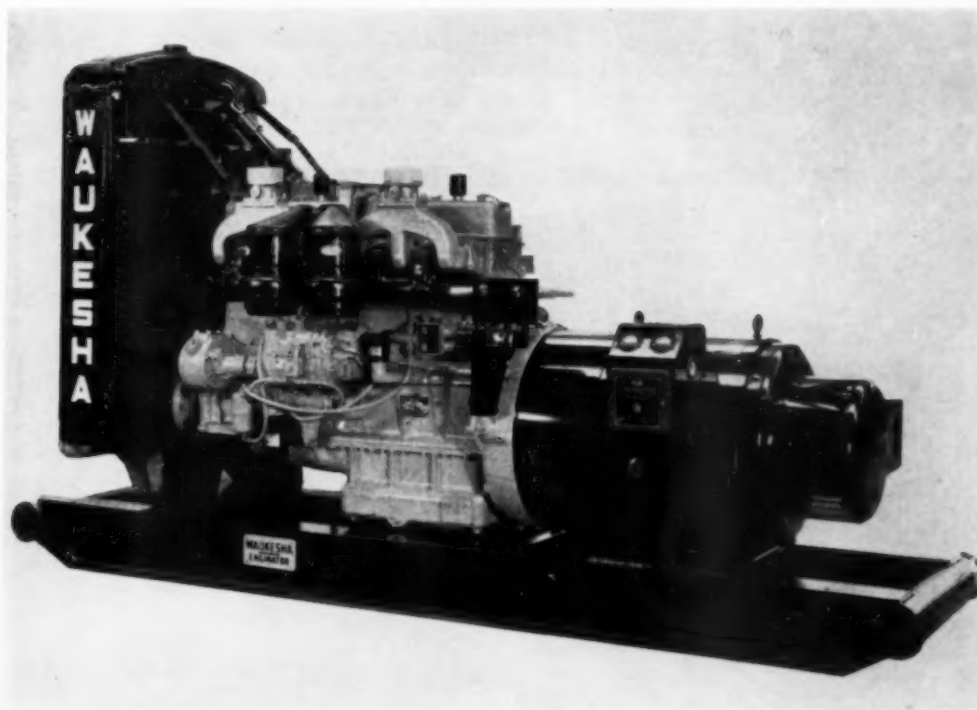


Recently completed hospital at Richards-Gebaur Air Force Base, a central air defense base for the entire country. Waukesha 100 kw diesel generator set was installed under supervision of Chief Engineer, Earl Weaver.

supervision of Earl Weaver, chief engineer. This automatic unit takes over in less than five seconds in case of power failure, providing almost instant power for hospital operating rooms, OB room, exit lights, hall lights, vacuum pumps, air pressure motors, chilled water pumps and an elevator. The

1200 rpm Waukesha diesel unit was prepared for automatic operation in the shops of the AAA Engine & Electric Co., Kansas City, Kan., of which W. J. Hewitt, is president, and furnished to Boese-Hilburn Electric Co., Kansas City, contractors for the electric work on the new hospital. The unit was included in the architect's plans and the recommendations of Burns & McDonnell, consulting engineers. AAA furnished the auxiliary equipment. The 100 kw generator, made by Electric Machinery, is direct-connected to the engine flywheel with a flexible drive coupling, and generates 60 cycle, 3 phase alternating current at 120, 208 volts. Engine controls were custom built in the AAA shop and the generator control panel by Simplex is mounted away from the engine. The Waukesha diesel, which uses American Bosch injector equipment, is fitted with fuel oil pressure gauge, fuel supply pump, Fram fuel supply filters, Winslow lubricating oil filters, Donaldson air cleaners, oil bath type. Automatic transfer switches were made by Zenith Electric and included is a battery charger with two charging rates and an indicating ammeter. Starting system is a 24-volt Delco-Remy and muffler is a Burgess-Manning.

Waukesha diesel-electric Enginotor with automatic controls installed as standby emergency equipment in the lower level of the base hospital at Richards-Gebaur Air Force Base. Engine drives 100 kw Electric Machinery generator and has American Bosch fuel injection equipment. Note Donaldson oil bath air cleaners and Fram fuel filter.



# NEW HIGHWAY TRACTOR

**K**EYNOTED with the slogan, "Look of Tomorrow," White Motor Co. has introduced its new "5000" diesel highway tractor line featuring a trim, fiberglass power-tilt cab and functionally designed for modern highways and payloads. The new White measures only 50 in. from its bumper to the back of the cab with the engine completely encased. White has selected Cummins diesels to power the line and tractors are available in a range from 180 to 262 hp. In announcing this major model change, Henry J. Nave, executive vice president of the company's White Truck Division, stated that the trucking industry is in the midst of a tremendous growth surge which is revolutionizing its highway equipment needs. "The need," he said, "is already here for highway units that are completely capable of achieving bigger payloads over higher annual mileages and on schedules that were undreamed of only a few years ago, yet today are considered necessary for profitable business. Every factor of operation has been taken into consideration to achieve the lowest possible cost per ton-mile of payload under today's operating conditions and in anticipating our nation's future needs."

In 50 ft. states, an operator can use a 43 ft. 8 in. trailer with the White "5000".

The new White is powered with either of five Cummins diesels, with the NH-180 and Clark Synchromesh transmission standard. Note Winslow lube oil filter and two piece exhaust system.

One of the functional advantages of the "5000" is the accessibility made possible by the power-tilt cab. Refinements in this new line include an access door panel in the front of the cab to permit engine oil check and fan belt tension adjustment. Also the aluminium grill can be quickly removed for radiator servicing and inspection. The complete cab is power-tilted for maintenance at a turn of a key, in a matter of seconds, using the actuator-type tilt introduced originally on the White 3000. A venturi is built into the exhaust system between the engine and the exhaust stack to permit tilting without any mechanical disconnecting of the exhaust stack. The venturi system also allows cool air to be mixed with the exhaust gas and reduce the temperature of the exhaust through the stack.

Two versions of the new tractor are available—the Light 5000 and the Ultralight 5000. The former weighs 10,570 lbs. less fuel and 5th wheel and the latter, by extensive use of lightweight materials, weighs 1,250 lbs. less. The Cummins NH-180 diesel rated 180 hp at 2100 rpm is standard on the "5000" with the 190 hp HRFB, NH-195, NH-220 and 262 hp NTO optional. The transmission is a 9 speed Clark synchromesh, power shift with aluminum case. A drop box at the rear of the transmission lowers the drive shaft  $8\frac{3}{16}$  in. Clutch is the 14 in. two-plate type, air actuated. Standard wheelbase on the "5000" is 106 in. with options of 112, 124, 130, 142, 154, 172, 196, 214 and 226 in. The front axle is the manufacturer's wide track, model 121D, 12,000 lbs. capacity and the rear is a model 124C, single reduction, full-floating.



Door panel provides ready access to engine for oil check and fan belt adjustment.





## Michigan-Ohio News

By Jim Brown

A NEW rear dump of 22 ton capacity has been announced by Euclid Division of General Motors Corp. Called the model S-12 it consists of an over-hung engine type tractor with an Easton-built variable wheel base semi-trailer. The tractor is powered by a 218 hp diesel and is equipped with a 5-speed transmission. Top speed with full load is 22.6 mph. Tractor and trailer tires are 24.00 x 24, 24 ply rating.

GEORGE Bahti of St. Clair Shores, Mich. has accepted delivery on a new 175 hp JT-6-B Cummins diesel engine for his IH model LF-194 truck. The sale was made by Cummins Diesel Michigan, Inc. of Dearborn.

J. R. PANELLI Equipment Co. of Detroit has recently delivered a 600 cfm Blue Brute Worthington air compressor to Great Lakes Steel Corp. of Ecorse, Mich. The new air compressor is powered by a GM 6-71 Detroit diesel engine.

CARL Osborne, formerly with the service department of Clark Equipment Co., has joined The Galion Iron Works & Mfg. Co., Galion, Ohio as assistant service manager. Osborne will work under Galion service manager Charles O. Evans.

A NORTHWEST model 95 combination clam, dragline and pull shovel was recently delivered to Nelson Sharrow of Marine City, Mich. The new Northwest is powered by a Murphy model 21 diesel engine and will be used on a sewer expansion program in the city of Warren, Mich. Sale was made by Cyril J. Burke, Inc. of Detroit.

TOM Robinson & Son of Jackson, Mich. have purchased two Allis-Chalmers model TS-160 Motor Scrapers from Earle Equipment Co. of Detroit. The scrapers are powered by AC TDS-516 diesel engines (155 hp) and have a struck capacity of 7 cu. yds.

GLENN Hoke has been appointed to the Michigan territory for The Deming Co., Salem, Ohio, manufacturers of pumps and water systems. Mr. Hoke was born in Salem, Ohio and served in the U.S. Navy in World War II. After the war he joined The Natural Gas Co. of Ohio in a sales and sales promotion capacity. Mr. Hoke has worked in several departments of The Deming Co. prior to his assignment to Michigan.

MICHIGAN Limestone Co. of Rogers City, Mich., a subsidiary of U.S. Steel Corp. has purchased an International TD-24 crawler tractor equipped with

torque converter and bulldozer blade. Sale was made by Wolverine Tractor and Equipment Company of Detroit.

A PETTIBONE model 125 loader equipped with a Hercules DD339 diesel engine was recently purchased by Fritz Bros. of Detroit for handling pig-iron and sand in their foundry. The sale was made by Cyril J. Burke, Inc., Michigan distributors for Hercules diesel engines, in Detroit.

GALION Iron Works & Mfg. Co. of Galion, Ohio announced the appointment of William R. Troyer as sales manager of Galion's special products division, and Porter Little as supervisor of sales and service training on Galion graders and rollers. For the past three years Troyer has been supervisor of sales and service training on Galion graders and rollers. For the past five years Little has been Galion district representative in the South.

R. G. MOELLER Co. of Detroit has sold a 2½ yd. Lorain model 85A shovel equipped with a Caterpillar D337F diesel engine with torque converter. The new Lorain will be put to work by the St. Lawrence Cement Co. at Dundee, Mich.

MORTON Salt Co. of Port Huron, Mich. has accepted delivery on two Cummins 290 hp model NHS diesel engines. The engines were purchased from Cummins Diesel Michigan Inc. of Dearborn and will be used to power brine well pumps.

BALDWIN-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio announces two new additions to the Lima line of power shovels, cranes, draglines and pull-shovels. These new machines are designed as types 64 and 64-SC. Both machines are equipped with Lima air controls. The type 64 has a rated capacity of 40 tons when equipped as a crane. When equipped as a shovel, it has a 22 ft. boom, 17 ft. dipper handle and 1¼ cu. yd. dipper.

TELFORD Equipment Co., Inc. of Detroit has delivered a model D Tournapull to Biggerman Inc. of Wyandotte, Mich. The Tournapull is powered by a GM 4-71 Detroit diesel engine and will be used by Biggerman Inc. for industrial site preparation work.

GIANNETTI Bros Co. of Detroit has accepted delivery on a ¾ yd. Northwest model 25 pull shovel powered by a Murphy model 11 diesel engine. The new shovel was sold by Cyril J. Burke, Inc. of Detroit and will be broken in on the Edsel Ford Expressway in Detroit.

EUCLID Division of General Motors

has announced a third model in the six-wheel 18 yd. scraper line. This model SS-18 is powered by a Cummins NHRS engine of 320 hp rating. It is equipped with a 10 speed transmission and 24.00 x 25 drive scraper tires. Capacity is 18 yds. struck at 3:1 slope, and 24 yds. heaped at 1:1. The scraper bowl can be interchanged with a 17 yd. Euclid Bottom Dump.

CHARLES Burnash, a general contractor from Montrose, Mich. has purchased an International model TD20 crawler tractor from Wolverine Tractor and Equipment Co. of Detroit and Grand Rapids.

THE Construction Machinery Division, Clark Equipment Co., has introduced a "Michigan" model 110 4-wheel scraper. Its capacity is 8 cu. yds. struck, 10½ yds. heaped. Teamed with a model 180 tractor dozer or equivalent prime mover, the model 110 offers all-hydraulic control. The scraper is 27 ft. 7¼ in. long,

8 ft. 4½ in. wide and 9 ft. 6 in. high. Empty weight is 14,450 lbs.; fully loaded, 40,450 lbs. Rear wheel air brakes are optional.

A 1 YD. Northwest model 41 pull shovel powered by a Murphy diesel engine was recently sold to Dean Monagin of Oak Park, Mich. by Cyril J. Burke, Inc. of Detroit.

WOLVERINE Tractor and Equipment Co. has recently delivered a model 30-B (1¼ yd.) Bucyrus-Erie shovel powered by a GM Detroit diesel engine to J. Valvona of Detroit.

AN OLIVER OC-43D dozer equipped with a Hercules engine was recently sold to Sugden & Sivier Inc. of Oak Park, Mich. The new Oliver was purchased from Cyril J. Burke, Inc. of Detroit and will be broken in at Selfridge Field Air Force Base where it will be used in adding runways and widening existing runways.

**Murray & Tregurtha**

# HARBORMASTERS

**solve tough marine power and steering problems!**



Models from 40 to 400 h.p. (Series O-4 illustrated; 40-50 h.p., Gas or Diesel).

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Please send me New Catalog giving details and showing many photos of Harbormasters in action.

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Another

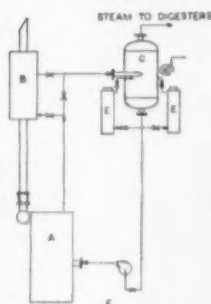
## VAPOR PHASE<sup>®</sup> INSTALLATION REPORT

### COMPLETE VAPOR PHASE. Heat Recovery and Cooling Systems Designed and Furnished by Engineering Controls

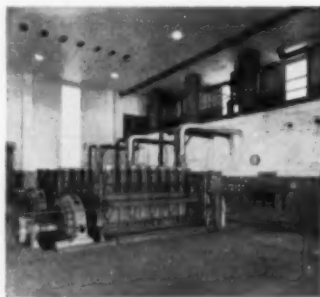
#### San Jose Sewage Disposal Plant Reports . . .

These Operating Advantages with VAPOR PHASE<sup>®</sup> on the Job:

- Prevention of Corrosion due to sulfur in sludge used as main fuel.
- Estimated Fuel Economy of 4%.
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- Less Wear. No moisture condensation in engine cylinders because temperatures never drop below dew point of 194°F.
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- A — Engine
- B — One of 3 Exhaust Heat Recovery Silencers
- C — Single Vapor Phase Separator
- D — Make-up Valve
- E — (2) 75 KW Electric Heaters
- F — Water Pump



"Sole Developers and Manufacturers of Vapor Phase<sup>®</sup> Thermal Circulation (Ebullition) Engine Cooling Systems"



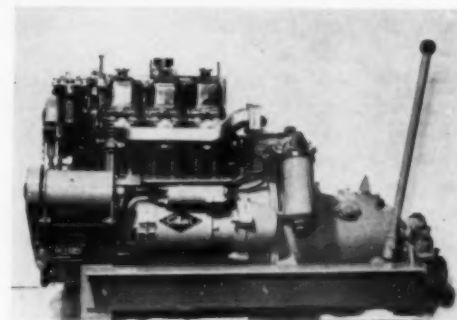
#### ENGINEERING CONTROLS Incorporated

AN AFFILIATE OF ST. LOUIS SHIPBUILDING & STEEL CO.

611 E. Marceau St.  
St. Louis 11, Mo.

1939 N. Hillhurst Ave.  
Los Angeles 27, Calif.

#### New Petter Engine at Boat Show



Petter PC3RMR air cooled diesel rated 15 hp at 3000 rpm.

Orenda Industrial Inc. are taking space in this year's New York Boat Show three times the size of previous years. They plan to feature their new PC range of Petter air cooled, light weight, high speed marine engines. On display will be a four cylinder PC4M model, which has a net weight of 511 lbs. and will run one hour on a gallon of diesel fuel. In addition to the low cost of running these new engines and the weight reduction, they feature compactness of design, making the engine suitable for all sizes of boats. The PCM engines come in 1 to 4 cylinder sizes with continuous power up to 20 bhp at 3000 rpm. Air cooled engines are becoming increasingly popular for marine applications, and Petters will also display this year their air cooled PH1RMR which develops 7½ bhp at 1800 rpm with a 2:1 reduction gear. In addition to these air cooled marine engines, Petters will show their PC3, a three cylinder version of the PC engines, which were introduced to the American market last year and have proved very well suited for powering pumps, generators and refrigeration equipment, among other applications. The Petter display will also include a 1500 watt and a 6500 watt generator set powered by their PAZ1 and AV2 engines respectively and using a Winpower 32 volt dc battery charging generator. Also in the Petter booth will be a water cooled AV2RMR twin cylinder marine propulsion engine fitted with reverse and 2:1 reduction gear. This engine produces 12 bhp at 1800 rpm.

#### Ross Pipe Line Aftercooler For Air Compressor Service

A new line of pipe line aftercoolers designed to cover the range of conditions encountered in industrial air compressor service has been introduced by American-Standard, Ross Heat Exchanger Division. Designated type A-100, this series is



fully standardized to eliminate the high engineering costs and long delays involved in custom fabrication. All features including the steel shell construction, corrosion resistant, removable tube bundle, packed floating head, and non-metallic baffles emphasize dependable, economical performance.



A new and improved moisture separator employs centrifugal force to remove entrainment from the line. The "counter current flow" design (air in tubes flowing counter to water in shell) permits the coldest (incoming) water to serve the coldest (outgoing) air for maximum heat transfer efficiency. All sizes are rated for either 10° or 15° temperature approach. Ross pipe line aftercoolers are offered in 54 models with capacities specified for operating pressures up to 125 psig for single and two-stage compression. Specially engineered units can also be fabricated to meet unusual cooling requirements. Complete information can be obtained by requesting new Bulletin 302.6K1 from American-Standard, Ross Heat Exchanger Division, Buffalo 5, N. Y.

(ITS NEW)

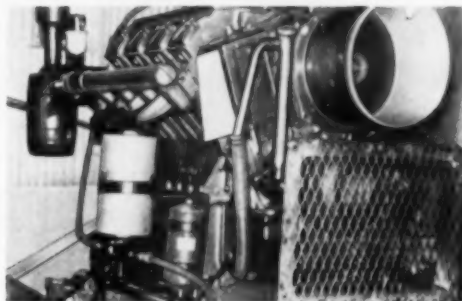
### 600 hp Diesel Yacht

One of the late arrivals to the Detroit yachting scene this summer was the 55 ft. Chris Craft Constellation *NO-LA-VAN II*, built for Northville



Laboratories, Inc. of Northville, Mich. Powered by two 300 hp turbocharged General Motors Diesels, the craft approaches a top speed of 24 mph. She sleeps ten and has air-conditioned living quarters. Following a late summer cruise in Great Lakes waters, she went south for a winter berth in Florida.

### Efficient Operation On Crude Oil



The above picture shows a Deutz model A8L 614 crude oil burning V-8 air-cooled diesel engine (650 cu. in., 100 hp at 1500 rpm) in an installation on the Polhamus Flood in Eureka, Southwest Kansas, where the Wood Oil Co. of Tulsa, Okla., is injecting 7000 bls. of water daily. This injection pump was originally powered by a 100 hp electric motor. Since installing the Deutz engine, Wood Oil Co. made considerable savings. Deutz air-cooled diesel engines are manufactured by Kloeckner-Humboldt-Deutz A.G., Cologne, West Germany and imported into the United States by its subsidiary, the Diesel Energy Corp. of 82 Beaver Street, New York City.

## BRIGGS OFFERS YOU, FREE, A 16 PAGE MANUAL ON OIL FILTERS AND METHODS OF INSTALLATION

HERE is a big 8½" x 11", file size, 16 page, fully illustrated booklet. It's brimful of technical data and drawings that every designer and operating engineer will want to read or keep for ready reference. Write for your copy. No obligation.



## OIL FILTERS FILTER / SEPARATORS



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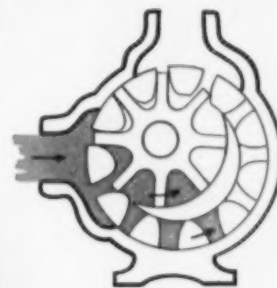
THE BRIGGS FILTRATION COMPANY, DEPT. 281, WASHINGTON 16, D.C.  
AT NO COST or obligation, send me the above booklet

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## WHY are Viking rotary pumps BETTER?



## BECAUSE

they are  
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The Viking "gear-within-a-gear" pumping principle makes liquids flow into and through the pump, changing direction ever so slightly until liquids are trapped. This action cuts turbulence, foaming, cavitation and power consumption to a minimum. As a result, liquids are delivered in a smooth, positive flow... free of aeration.

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**THIS MUCH DIRT CAN RUIN A DIESEL ENGINE**



**THIS PUROLATOR FILTER**



**STOPPED THIS MUCH DIRT**

Diesels can't escape abrasive dirt . . . and it takes about 8 ounces of it to ruin an engine.

The 18 pounds of dirt shown above were stopped by a Purolator heavy duty dry type air filter on a rock drilling rig in 940 hours of operation—with no servicing of the filter required. The 6 cylinder, 2 cycle engine and the 750 CFM compressor used on the job were fully

protected through the toughest operating conditions. 18 pounds of dirt were stopped . . . none got through the filter.

There's a Purolator dry type air filter designed to meet the specific requirements of your operation. Write today for full information. If you have a particularly tough problem, describe it . . . Purolator has the solution.

*Filtration For Every Known Fluid*

**PUROLATOR**  
PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA



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## *1958 Diesel Engine Catalog*

**New complete  
information on  
engines and  
accessories**



### ***look at the contents***

- 1** **ENGINES**—All major manufacturers of diesel, dual fuel and gas engines are represented in multiple page sections. Text is supplemented with specifications, power curves, photographs and sectional views.
- 2** **TURBOCHARGERS and SUPERCHARGERS**—This section of manufacturers is detailed and fully illustrated to give complete information on this increasingly important phase of the industry.
- 3** **TRANSMISSIONS**—The latest information on torque converters, fluid drives, and other modern means of transmitting power are fully described and illustrated in this section.
- 4** **ACCESSORY EQUIPMENT**—Recent developments in fuel injection systems, governors, and other key accessory units are detailed and illustrated fully in this section.
- 5** **MARKET PLACE**—A convenient, time-saving listing of sources from which you can obtain the multitude of items and services needed by the fast growing Diesel Industry.
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VOLUME 23 of the DIESEL ENGINE CATALOG is now available and is the biggest, most complete edition published to date. It has been completely revised and rewritten with many new or extensively changed sections graphically describing new engines and accessories. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, this new Catalog is a practical necessity. Recognized as the "Bible of the Industry," the 1958 DIESEL ENGINE CATALOG is a big 400-page book. With the same size and wide-open format as in previous editions, reference is simple and quick. Each section is fully illustrated with pictures, power curves, specification charts and sectional views. Equally important, the text presents a full description of the products and their fields of application.

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### Diesel Yacht Target



The yacht *Target* is a twin screw cruiser having a flush deck and flying bridge. It is a symbol of beauty on the blue Florida waters. Designed and built by the Huckins Yacht Corp. in Jacksonville,

Fla. for Ferdinand Eberstadt of New York City and Cold Spring Harbor, N. Y., it has a length of 49 ft. and a beam of 14 ft. 3 in. It is powered with two General Motors 6-71 diesels and G. M. hydraulic 1.5:1 r&r gears driving 24x24 Federal Equipoise propellers to give it a cruising speed of 28 mph and a top speed of 30.2 mph.

### Anniversary Issue Wanted

\$20.00 FOR ONE COPY. MR. M. J. ARRINGTON, EXLINE ENGINE WORKS, P. O. BOX 446, SALINA, KANSAS, IS WILLING TO PAY \$20.00 FOR A COPY OF THE 50TH ANNIVERSARY ISSUE OF DIESEL PROGRESS WHICH WAS PUBLISHED IN 1948. IF YOU HAVE A COPY IN GOOD CONDITION, COMMUNICATE DIRECTLY WITH MR. ARRINGTON.

## The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for Diesel Engines



### FUEL INJECTION EQUIPMENT DIVISION OF LUCAS ELECTRICAL SERVICES, INC.

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AP 929

### Engine Air Filter Service Indicator

A new engine air filter indicator, actuated directly by pressure drop across the air cleaner, has been introduced by Bacharach Industrial Instrument Co. Because the indicator requires no electric circuit its installation is simple and inexpensive, its signal is certain, and there is no explosion hazard. This indicator can be mounted in any position at the air cleaner or on the dashboard. Requires only one connection—piping to the clean air side of the filter. As dirt gathers in the filter, and restriction of air flow increases, a vivid red thimble gradually rises and is clearly visible through the indicator's transparent signal window. When restriction of air flow across the air cleaner has reached the upper limit for efficient filter performance, the red thimble locks in full view. After the filter is serviced, the red thimble can be returned to its low position by depressing the indicator's reset button. The indicator can be used with all standard dry-type or oil-bath engine air cleaners, over an exceptionally wide range of filter differential pressure ratings. It is factory-preset for the proper signalling



point to suit the application. While designed primarily for air filter application on internal combustion engines including diesel (normally-aspirated or super-charged), gasoline, butane and natural gas engines, it is equally well suited for fuel oil filters and many industrial applications among which are pneumatic systems, dust collector equipment and wherever a signal is needed to give warning of excessive suction or vacuum in the system. Features of the indicator include: (1) Signal actuated directly by increase in suction pressure—not dependent on electrical system; (2) Signal rises gradually as dirt gathers in filter, clearly indicating when the filter element is approaching the permissible restriction of air flow; (3) Signal remains locked in full view when filter requires servicing, and can be quickly reset manually after the filter is serviced. Other features of the indicator are its compact size, its self-contained design which provides complete protection against corrosion, oil, dirt, moisture and the weather, and its rugged construction which withstands severe engine vibration, shock, or other operating conditions. It maintains its calibration indefinitely and will operate efficiently in temperatures from -40°F to 250°F. For further information request Leaflet 938A from Bacharach Industrial Instrument Co., Pittsburgh 8, Pa.

(ITS NEW)

DIESEL PROGRESS



## American Bosch Promotes Whelan

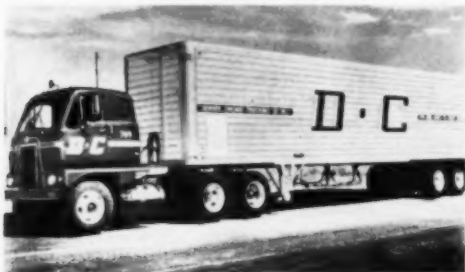


Robert M. Whelan

Appointment of Robert M. Whelan as assistant manager—service sales of American Bosch Division, American Bosch Arms Corp., Springfield, Mass., has been announced by Bert Cole, General Sales Manager. Mr. Whelan became associated with American Bosch in 1950 as a sales representative for the company's New York Service Sales organization. He had previously been with Esso Standard of New York City. In June of 1953, Whelan was transferred to the company's service sales department in Springfield and in August of that year he was appointed service sales representative for the territory comprising Minnesota, Wisconsin and North and South Dakota. Mr. Whelan attended Georgetown University and Columbia University where he majored in economics and marketing.

## Denver Chicago Adds International COE's

Denver Chicago Trucking Co., Inc., has recently put in service a number of International diesel cab-over-engine tractors as part of its highway fleet. The new International model DCOT-405 tractors feature 80 in. sleeper cabs, V-belt drive pusher axles and are powered by Cummins NH engines. Power trains include heavy-duty four-speed transmissions and two-speed rear axles. Denver Chicago officials pointed out that the new Internationals are fleet additions and will be used



primarily on runs between Chicago and the West Coast. The firm currently has 10,814 miles of highway rights, and also operates tanker service over irregular routes in seven western and mid-western states. Last year Denver Chicago's 2,100 pieces of rolling stock carried 1.6 million tons of freight while traveling 75,000,000 miles. Gross volume obtained in 1957 was \$37,000,000.

## Mobile Units Demonstrate Hydrotor

Capitalizing on the performance characteristic of its Hydrotor hydraulic cranking system, American Bosch, has launched a fleet of attractive mobile units to demonstrate these systems throughout the country. Each mobile unit consists of an actual diesel engine installed in a Ford Ranchero, or on a specially designed trailer. The engines (various makes are used) are equipped with the American Bosch Hydrotor cranking system, and can be started with the mere flip of a hand control lever. Engines are complete with cooling radiator and small fuel oil tank, so that the demonstration

can be repeated time after time—hundreds of times per day. The first such mobile unit to be built, is estimated to have been started well over 100,000 times already. According to American Bosch officials, many independent distributing outlets, have built or are building, their own mobile demonstrating units. The American Bosch Hydrotor consists basically of a positive displacement hydraulic motor, not unlike an electric starting motor in appearance. It is actuated by oil stored under pressure in an accumulator. The accumulator is charged automatically by an engine driven pump, and in emergency by a hand pump. A demand for the system is said to be growing rapidly from military circles, from the construction and marine fields, and from many other users of engine power—especially diesel power.



A lovely young lady demonstrates the ease in starting a diesel engine equipped with an American Bosch Hydrotor.

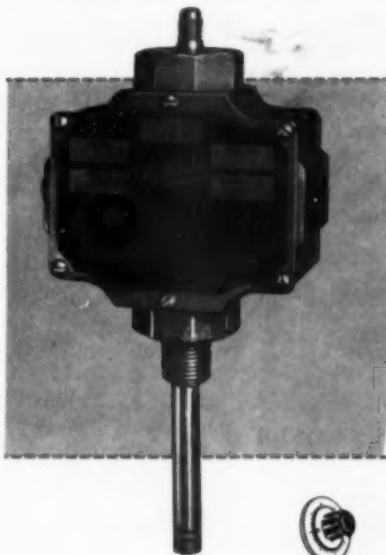
# ENGINE STOPS!

If cooling water too hot  
or oil pressure too low

Positive protection against engine damage  
with these Fulton Sylphon® Fail Safe Controls

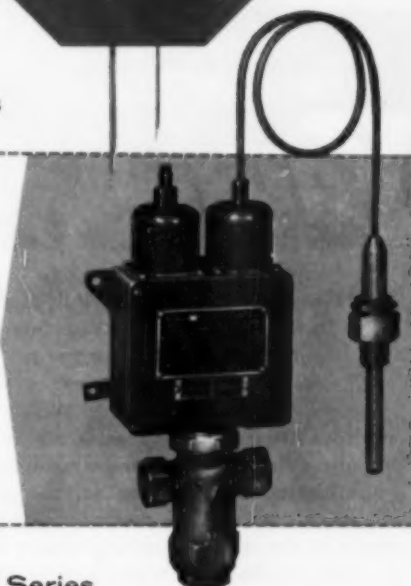
## No. 530 Series Remote Bulb Type FUEL SHUT-OFF Safety Control

Positive engine protection against high temperature jacket water and low pressure lube oil. Fuel oil supply is immediately shut off if either exceeds safe limits. Automatic shut-off if control is damaged accidentally. Alarm optional.



## No. 539 Series Integral Bulb Type 4-WAY SAFETY Temperature Pressure Switch

Sounds alarm, flashes warning light, operates pilot or stops internal combustion engines if lube oil pressure drops to danger point, or if cooling water temperature is too high. Suited for many other temperature-pressure applications. Explosion proof type available.



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CATALOG AD-H



Robertshaw-Fulton  
CONTROLS COMPANY

FULTON SYLPHON DIVISION • KNOXVILLE 1, TENN.

## West Coast News

By James Joseph

TO Calkins Crushing Co., Ocean Lake, Ore., an Allis-Chalmers model 6DAS-844 closed-type power unit with Twin Disc clutch, for powering portable crushing plant. Sale by Portland's Hamilton Engine Sales, Inc.

MERRIFIELD Trucking Co., Anaheim, Calif., prime hauler of citrus, both fresh and frozen, has installed a Kenworth TCF 521 with a Cummins NH-220 engine.

REPLACING a gasoline engine in the 36 ft. cruiser *Omea*, owned by Olympia, Washington's J. T. Trullinger, a GM 4-51 engine, rated 87 hp.

IN TRIAL run off San Diego was the Army Transportation Corps' \$2.5 million vertically-propped discharge beach lighter, Lt. Col. John U. D. Page, powered by two model 38D8 $\frac{1}{4}$  Fairbanks-Morse diesels.

TO Garrett Freightlines, Inc., Pocatello, Id., a Cummins NT-600 to repower a Kenworth tractor. Sale by Cummins Intermountain Diesel Sales, Salt Lake City.

TO Oakridge, Oregon's Green Tecon Construction Co., a 71-D Bucyrus with a model 11-17AK Torcon converter, working Oakridge-area dam project.

CARBORUNDUM Co., Vancouver, Wash., has purchased a model TG-45 Allis-Chalmers industrial towing tractor for its material handling operation in Vancouver.

FOR Spokane's R. E. Hangen, a Cummins NH-220 for repowering a Kenworth CC825C. Sale via Cummins Diesel Sales, Inc., Spokane.

Delivered to Merritt, Chapman and Scott, Priest Rapids, Wash., a model 4-19CK Torcon converter for use in a model 4500 Manitowoc.

TO Lone Pine, Calif.'s Inyo Builders, Inc., a Fairbanks-Morse 30 hp, 48B3 $\frac{1}{4}$ , 4-cylinder diesel generating set.

L & H PRODUCE Co. (Vancouver and Los Angeles) has installed a Hayes C22-42 truck with a Cummins NH-220. Sale by Cummins Diesel Sales of B.C., Ltd.

FOR Pacific Pumping Co., Portland, Ore., a 3 kw American MARC air cooled diesel generator set. Sale by Hamilton Engine Sales, Inc.

TRAILER-mounted, a 300 kw generator powered by an 8DCS-2505 Allis-Chalmers diesel (with Schramm air compressor), is working the Willamette Pass job for Hillsboro, Oregon's Tuss Bros. Construction Co.

INDEPENDENCE, Oregon's Central Paving Co. has taken delivery on a 250 kw Columbia generator, powering a gravel plant near Wenatchee, Wash.

TO HINES, Oregon's Edward Hines Lumber Co., a new FT75-24 Allis-Chalmers lift truck for operation in Hines' new plant which became operative on Nov. 1.

FOR Weyerhaeuser Timber Co., Chehalis, Wash., a Cummins NH-220 for repowering a Mack LMSWM, scheduled for service at Camp Vail, Wash.

WARDS Cove Packing Co., Seattle, has

taken delivery of a GM 6-110 marine engine for the cannery tender *Vanguard*. Sale by Evans Engine and Equipment Co., Inc., Seattle.

DELIVERED: a model 1250 Lima shovel powered by an Allis-Chalmers 8DAS-1125 diesel (with 4-18CK Torcon converter) to Portland's Carl M. Halvorsen Construction Co.

it makes sense  
**ONE SOURCE**  
**ONE RESPONSIBILITY**  
for all  
**DIESEL**  
**COOLING**  
Requirements



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ONE source, one responsibility for all cooling requirements is the sensible approach to solving heat transfer problems.

By using one reliable source, you automatically solve problems of service, and there is never a question of responsibility for performance. Young's wide range of products and over 30 years experience in designing, engineering and manufacturing heat transfer equipment for the diesel field qualifies them as the most logical source for all your cooling needs. Let us show you what undivided responsibility can mean in the way of economy, quality control and efficiency of performance. Write, wire or call without obligation.

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| <input type="checkbox"/> Cat. No. 1652 — Young Supercharger Air Intercoolers         | <input type="checkbox"/> Cat. No. 1356 — Young Jacket Water Coolers      | <input type="checkbox"/> Cat. No. 557 — Horizontal Core Air Cooled Heat Exchangers |
| <input type="checkbox"/> Cat. No. 1258 and No. 1156 — Shell and Tube Heat Exchangers | <input type="checkbox"/> Cat. No. 1054A — Young Torque Converter Coolers | <input type="checkbox"/> Cat. No. 3558 — Type "OH" Unit Oil Coolers                |

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City .....

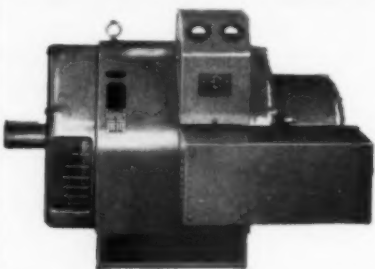
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A COMPLETELY NEW  
"PACKAGED" GENERATOR

**AMP-PAK**



AMP-PAK Generator shown is rated at 187 kva, 1200 rpm, 240/480 volts. AMP-PAK is available in ratings of 75 thru 187 kva at 1800 rpm and 62 $\frac{1}{2}$  thru 187 kva at 1200 rpm. Three phase, 80% PF, 60 cycles, 50C rise, and 120/208, 240 and 480 volts.

No exciter... No moving parts  
in the voltage regulator

AMP-PAK is a compact, revolving field a-c generator with built-in, static excitation system; static voltage regulator; and basic metering and controls conveniently grouped. AMP-PAK is a portable unit, factory assembled, internally connected, and tested.

No rotating exciter to maintain. D-C excitation is provided by a heavy duty, long-life, static rectifier.

No tubes, relays, vibrators to service. Voltage is regulated by a static, E-M-developed sensing circuit and "magical" magnetic amplifiers.

Holds voltage "rock-steady" so your motors, lights, and electronic equipment will work better. The static regulator provides  $\pm 2\%$  regulation.

Starts big motors. A special, built-in voltage booster transformer stands by to reinforce line voltage when heavy loads are suddenly applied.

Easy to install. Needs no switchboard. Just connect load to AMP-PAK thru a suitable line switch.

Simple to operate. Has no belts, no "tricky" commutator, no adjustments — anyone can operate AMP-PAK.

See your nearest E-M Sales Engineer and write the factory for publication PRD-236.



**ELECTRIC MACHINERY MFG. COMPANY**  
Minneapolis 13, Minnesota

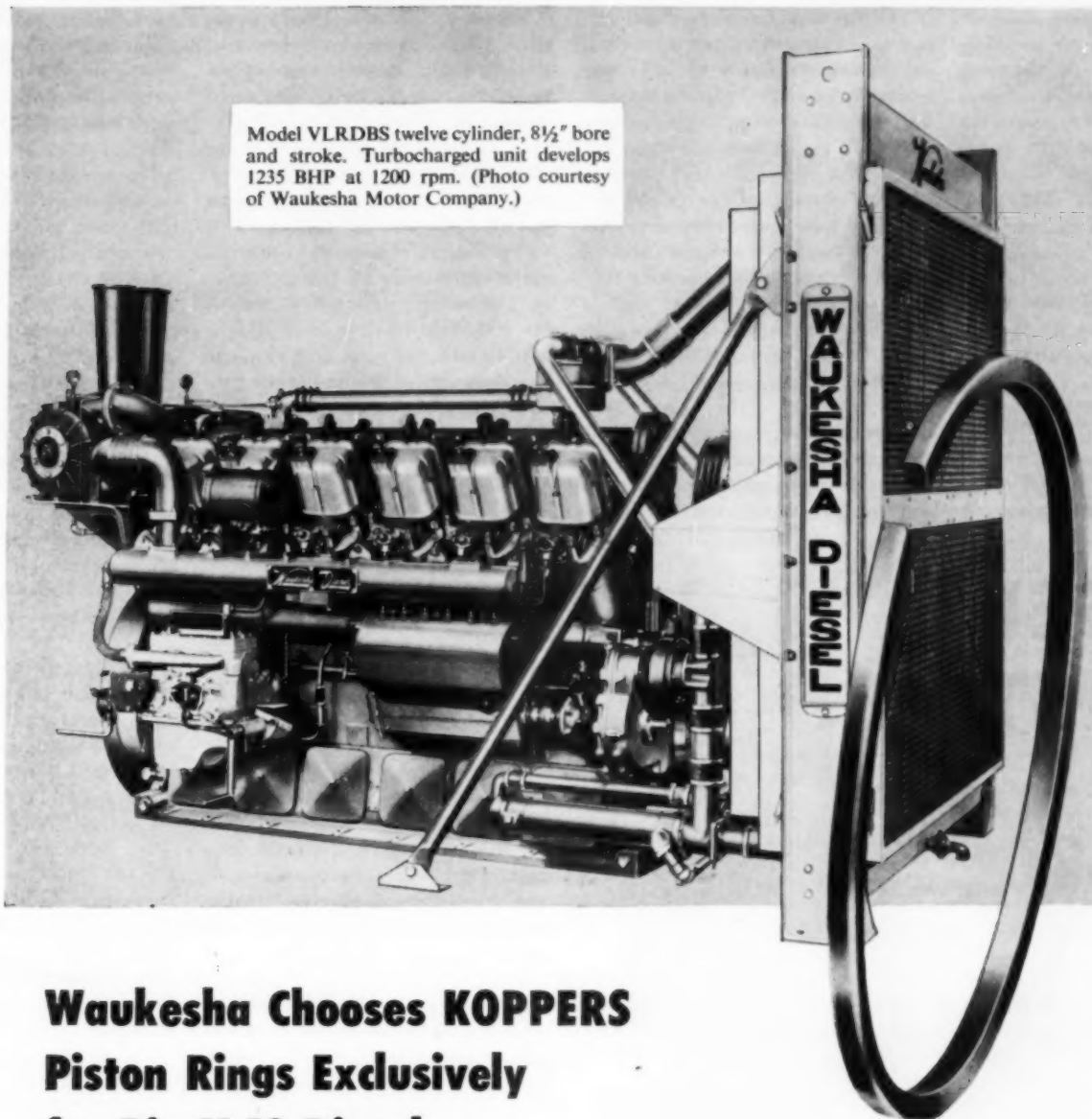
Largest manufacturer of "Packaged" Generators

2100-TPA-2154

DIESEL PROGRESS



Model VLRDBS twelve cylinder, 8½" bore and stroke. Turbocharged unit develops 1235 BHP at 1200 rpm. (Photo courtesy of Waukesha Motor Company.)



## Waukesha Chooses KOPPERS Piston Rings Exclusively for Big V-12 Diesels

Waukesha's VLRDBS supercharged diesels are perfectly suited for applications such as oil rigs, excavators and tugboats where a surge of reserve power is essential for emergency and overload demands.

This recent series of diesels manufactured by the Waukesha Motor Company, of Waukesha, Wisconsin, is designed to develop tremendous power under the severest operating conditions . . . the kind of power that puts a premium on piston ring performance. Waukesha has selected Koppers Piston Rings as have other manufacturers who must be certain of reliable component performance.

This dependability is yours when you rely on Koppers with their complete range of materials . . . wide selection of types and sizes

. . . rigid quality control and careful inspection. These factors contribute to Koppers unchallenged leadership in producing the finest piston and sealing rings for industry.

Instead of undergoing needless expense in solving ring problems, take advantage of Koppers experience, research facilities and craftsmanship. Write for information today. KOPPERS COMPANY, INC., Piston Ring and Seal Dept., 1401 Hamburg St., Baltimore 3, Md.

★ KOPPERS DEPENDABLE RINGS CONTRIBUTE TO WAUKESHA'S RELIABLE PERFORMANCE UNDER THE MOST RUGGED CONDITIONS.



**AMERICAN HAMMERED**  
**Industrial Piston Rings**  
*Engineered Products Sold with Service*

## Florida Diesel News

By Ed Dennis

GENERAL Motors model 4-71 diesel supplies power for the new Hobart motor generator ground power unit that was recently delivered to Pan American Airways for use in its new Jet plane program; the name plate reads: 60 kva, 48 kw, 1714 rpm, 115/200 volts, 173 amps.

DIESEL Shipbuilding Co. of Jacksonville launched the twin screw tug *Gatco New York* for the Gulf Atlantic Towing Co. Engine room specifications called for two D375 turbocharged Caterpillar diesel engines rated 325 hp each with 3:1 Twin Disc hydraulic r&r gears and two D311 Caterpillar diesel 30 kw generating units.

CUMMINS Diesel Engines of Florida, engineering the installation of a model NHRS-600 Cummins diesel developing

320 hp at 2100 rpm with Capitol 2.5:1 hydraulic r&r gears on the yacht *Sunbeam* plus a model JMS 150 hp Cummins on a fishing vessel for Thompson Fisheries of Key West.

DUNEDIN Fish Co. of Dunedin, Fla. had a model 6DAMR-273 Allis Chalmers marine diesel rated 57 hp at 2000 rpm with Capitol 2:1 hydraulic r&r gears installed in their shrimp bait boat, from Gulf Coast Engine Sales Inc., Tampa.

CITY of Starke has one of the few municipal power plants in Florida that has excess capacity. The latest additions were five model 80-SX-8 Superior diesels each rated 1393 hp at 360 rpm. Each of the Electric Machinery generators are rated 1000 kw, 0.8 pf, 2400/4160 volts. The plant operates on 4160 volts.

OUTFITTED at Dade Drydock, the 200 x 34 ft. *Moroccan Bay*, to be used as a Brazilian freighter, powered with two General Motors 16-278-A diesels

for main propulsion and two 3-268 G. M. dieselized 100 kw Delco generator units.

FIVE Grayline sightseeing coaches in the Miami area are powered with model 487-C-18-A P&H 2 cycle diesel engines. These 4 cyl. engines have a bore and stroke of 4.5x5.5, develop a max. of 200 hp at 1800 rpm and have Spicer transmissions.

FIRST model T. C. 12 Euclid twin power crawler tractor to operate in Florida is being worked by the Ballenger Paving Co. near Plant City. The twin General Motors 6-71 diesels deliver 402 net hp. This new tractor weighs 67,800 lbs.

WAUKESHA 350 kw at 1200 rpm generating set was installed in the new Peninsular Telephone Co. building in St. Petersburg. It is skid mounted and the heat exchanger uses the roof top air conditioner cooling tower.

HAMILTON diesel generating set at St. Cloud is giving a good account of itself. The model 521-SA engine develops 2450 bhp at 260 rpm, the Allis Chalmers generator develops 1875 kw, 2400/4160 volts, 564/325 amps. Installation includes a Woodward U G 32 governor and Madison Kipp lubricators.

GREAT Southern Trucking Co. at Jacksonville operates 78 model 860 General Motors OTR tractors with 6-71 diesel engines plus 30 White tractors with model NH 180 Cummins diesel engines. Both types of diesels have Fuller transmissions. On order are 15 model B61 Macks with #673 Mack diesels.

ELLIS Diesel Sales & Service of Fort Lauderdale repowered the 80 ft. *Tiempo II* of Panama with two 6-71 turbocharged General Motors diesels and 2.5:1 G. M. hydraulic r&r gears. And a pair of 6-71's were delivered for the 54 ft. yacht *On Time* of Pompano Beach. It too had G. M. hydraulic r&r gears.

AT WASHINGTON, Ga. the Russell Transfer Co. had their International tractor repowered from a gasoline engine to a diesel with a model JT6-B Cummins rated 175 hp and the Austell Box Board of Austell made a similar change in a L. J. T. Mack with a NH6-BI Cummins having a cont. hp rating of 192 at 1800 rpm.

LATEST addition to the tug fleet of Compania Ramrey International of Puerto La Cruz, Venezuela is the 105 ft. *Los Cocos* powered with a model DMR-38 Enterprise marine diesel having a hp of 2100 at 300 rpm. This new tug also has two 40 kw 60 cycle ac generating sets and a fuel oil capacity of 42000 gals.

1500 WATT Petter with a Win-power generator for the lighting plant on the newly launched *Sunglow* of St. Augustine. Main propulsion is a D342 Caterpillar and 3:1 r&r gears. Launched by Diesel Engine Sales which also launched the *Senor Mike* of Tampa with similar propulsion.

SOUTHERN Clays Co. of Gordon Ga. had a model H6-BI, 160 hp Cummins diesel installed in their General Electric locomotive and the Carmichael Coal Co. of Jasper Ala. had a 320 hp model NHRS 6-BI Cummins dieselized power unit installed at the mine.

THE 42 ft. yawl *Adarba* owned by Charles Julian of Fort Lauderdale had a model OM636 Mercedes Benz rated 36 hp at 3000 rpm installed with Paragon 2:1 r&r gears at Allied Marine.

AT MARATHON on the Florida Keys, the 48 ft. charter sportsfishing boat *Mystery II* had two model X220 Ford marine diesel engines with 2:1 Capital r&r gears installed. These are marined by Modern Diesel Power Co. of Tampa; sold by Southeast Diesel Marine Inc.

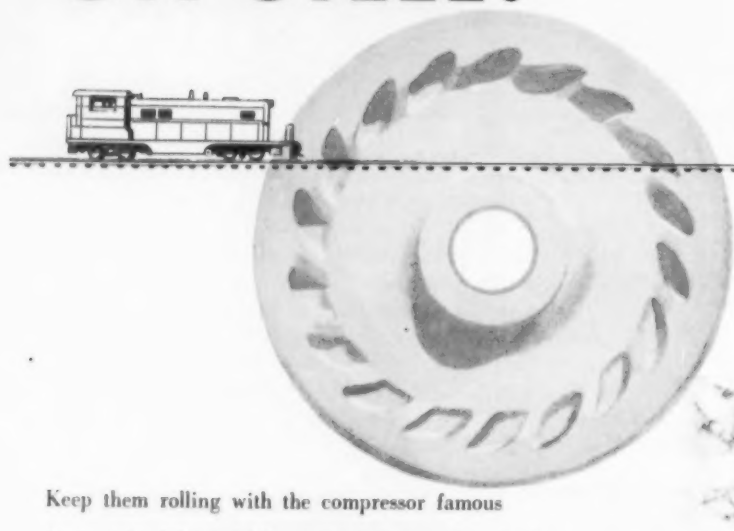
POWER for the 6 in. fish pump on the 154 ft. menhaden fishing vessel *Sandy Hook* is provided by a Deutz aircooled V8 diesel engine rated 120 hp at 1800 rpm. This new idea of air cooled marine diesel engines is being watched with interest by the fishing industry.

DELCO 110/220 volt, 60 kw generating set powered by a General Motors 6-71 diesel engine was installed at the Ocean Manor Hotel at Galt Mile. This standby unit takes care of all the hotel's needs including the elevators, by the Ellis Diesel Sales & Service who also delivered a model 4-51 G. M. diesel to be directly coupled to the low pressure pump on a model 36GD3466 speed sprayer at Pounds Grove, Davie.

THE *Cetacean* a pint sized self contained, diesel electric propelled photographic submarine arrived in Miami for photographic exploration of underwater life in the Florida and Bahama Island waters. It is propelled by a model D. I. X. Hercules diesel engine rated 150 hp at 3000 rpm and can run submerged for 8 hrs. at 9 knots on its 225 volt Goulds batteries.

**HERE IS IMPORTANT INFORMATION!** The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

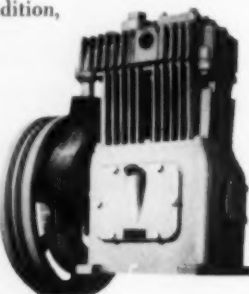
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## DEMA Elects New Officers for 1959

Following its recent annual meeting, the Diesel Engine Manufacturers Association has announced the following officers for 1959: President: John N. MacKendrick, president, Clark Bros. Co.; Vice Presidents: William E. Butts, president, General Metals Corp. and Eugene L. Miller, president, The Cooper-Bessemer Corp.; Treasurer: Robert H. Morse, Jr., president, Fairbanks, Morse & Co.; Executive Secretary: Robert L. Stanley. Directors of the association for the coming year are: William F. Burrows, vice president and general manager, Diesel Engine Division, White Motor Co.; Guy J. Coffey, president, Chicago Pneumatic Tool Co.; M. C. Davison, vice president, Ingersoll-Rand Co.; Otto H. Fischer, president, The Union Diesel Co.; Robert E. Friend, president, Nordberg Mfg. Co.; Thomas E. Hughes, general manager, Cleveland Diesel Engine Division, General Motors Corp.; William F. Boyle, vice president and general manager, Hamilton Division, Baldwin-Lima-Hamilton Corp. and E. J. Schwanhauser, vice chairman, Worthington Corp.

## American MARC Appoints Burke

Mr. Francis L. Burke, former vice-president of General Motors Corp. has been appointed to the Board of Directors of American MARC Inc., Denis Kendall, president, announced. Mr. Burke was also appointed as a member of AMARC's Executive Committee and will actively serve as personal consultant to Kendall. A veteran of 30 years with General Motors, Burke served as vice-president of GM's Accessory Divisions, and as a member of the GM Board of Directors. American MARC, located in Inglewood, manufactures a complete line of diesel engines and generator sets and currently, several new engine designs are being developed for industrial and military use. "American MARC is very pleased to acquire the services of Mr. Burke at this point in our development," Kendall said today. "His years of experience and industrial know-how will be invaluable as we enter a dynamic era of growth and expansion to meet ever-increasing military and industrial demands."

## Clayton Uses Mobile Demonstration Units

Clayton Manufacturing Co. announces the acquisition and equipping of 28 International Harvester trucks with their new 280 Blast-Master steam cleaner and Clayton-Sellers heavy duty hydraulic jet cleaner units. These new cleaners, only recently announced by Clayton, are the heavy duty steam and hydraulic types. To speed the introduction of the

new Blast-Master, and Clayton-Sellers units, Clayton has purchased 28 model A-120,  $\frac{3}{4}$  ton trucks on which have been mounted demonstration units. Both the home factory at El Monte, Calif. and branch factory at Cincinnati, Ohio, are participating in this effort to speed delivery to nation wide territories. Every unit is self-sufficient complete with power plants and fuel storage. It's stated that these units fire up in one minute and are ready for operation. Some of their features include completely automatic operation, 75 per cent thermal efficiency, soap mixer, and full circle thermostat. These units will also furnish emergency cleaning whenever called upon and this service will be available to anyone. These units are being delivered now. Further information is available by writing the Clayton Manufacturing Co., 401 N. Temple City Blvd., El Monte, Calif.

ITS NEW

## Lee Named to Honeywell Post

Mr. Warren W. Lee has been appointed eastern region sales supervisor for systems engineering of Minneapolis-Honeywell Regulator Company's Brown Instruments division in Philadelphia. He joined Honeywell in 1950 and served in various capacities prior to his present assignment. He succeeds J. T. Teed, who has been named petroleum instrumentation market manager. Lee was graduated from Oklahoma A. & M. in mechanical engineering and from Harvard's Graduate School of Business Administration. During World War II he served five years with the Army Corps of Engineers, attaining the rank of major.

## Electronic Strip Chart Recorder

An electronic strip chart recorder with continuous integration has been developed by Brown Instruments division of Minneapolis-Honeywell Regulator Co. for rapidly fluctuating industrial processes. It measures, records and continuously totalizes any linear variable with respect to time, the company said. Although designed primarily for gas chromatography analysis it can be used to measure flow, continuous weighing systems, electric power line network consumption, and electric current in aluminum pot lines and other electrolytic cell lines. The instrument reads out the integration quantitatively on a six-digit electric counter at a rate of up to 1,000 counts/min., or records the qualitative or analog equivalent on a chart graduated in units and tens by means of a dual piping pen at a maximum rate of 500 strokes/min. The readout can be adapted to digital or data-handling systems in special applications by substitution of a contact-making counter. Full-scale travel of the recording pen requires

two seconds, but the instrument is available with or without piping pen. Available chart record speeds are 30, 60, 90 and 120 in./hr. The recorder is made with a live zero, permitting overtravel below the zero line. Accuracy of the integrator, which is equipped with a stroboscope for calibrating purposes, is plus or minus 0.5 per cent. Combined accuracy is plus or minus 1 per cent or better. The instrument can be actuated by any primary element, or transducer, which provides a linear d-c millivolt output within range limits. For further information, write to: Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44, Pa.

## Automatic Engine Control Literature

A new engineering application bulletin on automatic controls for engines and compressors has been prepared by The Cooper-Bessemer Corp. The bulletin

entitled, En-Tronic Pipeline Control, describes equipment for automatically starting, loading, capacity control, regulating and shutting down pipeline compressors. The En-Tronic Control equipment also applies to other types of power machinery such as gas, diesel and gas-diesel engines, as well as motor-driven reciprocating and centrifugal compressors commonly used for gas processing and air services. Write for Bulletin No. 87, The Cooper-Bessemer Corp., Mount Vernon, Ohio, Attention: Mr. F. L. Friedli.

ITS NEW

## HERE IS IMPORTANT INFORMATION!

The completely new 1958 edition of the DIESEL ENGINE CATALOG, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to DIESEL ENGINE CATALOG, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

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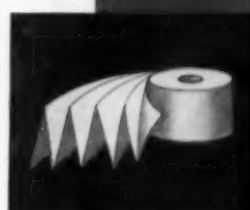
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DIVISION OF STANDARD SCREW COMPANY



Unique spiral paper construction provides 560 square inches filtering area.



YOU CAN DEPEND ON THE DIESEL THAT DEPENDS ON ROOSA MASTER

## Inland River Report

By A. D. Burroughs

SUPERIOR Welding Co., Peoria, Ill., has delivered a new 42 x 14 ft. tug, *Superior*, to Foster's Tug Service for duty in Havana, Ill., area. Main engine power comes from two GM 6-110's.

NEW, trim 33 ton single-screw towboat, *Co-Pilot's Sputnik*, is in action for Tuel Towing Co., Fly, Ohio. The 57 x 15.5 ft. craft is equipped with a Cummins engine for the rated 235 hp.

MAIN Iron Works, Houma, La., has completed a 54 x 15 ft. single-screw craft, *Gary K.*, for Garber Brothers Towing Co., Morgan City. Propulsion power is provided by a 300 hp GM Detroit engine.

NEAR-duplicate to the *Gary K* is the *Alamo*, also with a 300 hp GM Detroit engine for main push power, recently completed by Main Iron Works for the Cut Off, La., firm, Eymard, Danos, and Guidry.

TWO Caterpillar supercharged engines rated at 500 hp each supply performance power for the 1000 hp towboat, the *Kanawha*, now undergoing some revisions for upper river operation. Now owned by Starvaggi Enterprises, W. Va., the 65 x 22 ft. craft will be remembered as the *Lamarco I*.

CURRENT construction work at Barbour Metal Boat Works includes the

new grocery supply boat for owner, Frankie and Johnnie Boat Supplies. The 40 x 12 ft. craft will have a model 6-71 GM Detroit engine for the 165 hp.

NEW worker for a new company is the popular *Barbara Jane*. The 75 x 25 ft. towboat built in 1956 by Marine Welding and Repair Works for Logan & Lanchester, Greenville, Miss., is now owned by Harborline Towing Co., St. Louis. Two Caterpillar D-397 engines provide 1000 hp.

CENAC Towing Company's newest single-screw push boat is getting final touches at Main Iron Works. The still unnamed craft will have a rated 300 hp from a Cummins engine.

CONNIE JANE, a new 55 x 18 ft. vessel by and for the Delta Towing Co., is reported near completion. Two General Motors Detroit model 6-110's will develop the 500 hp.

MEMPHIS Mid-Stream Service, Socony-Mobil distributors, boast a new refueling boat, *City of Memphis*. The 50 x 16 ft. vessel, built by Marine Welding & Repair Works, is powered with two Model 6-71 GM Detroit engines.

CAPE Girardeau Sand Co., will have a new 60 x 15 ft. towboat in the near future with 325 hp from a turbocharged model D375 Caterpillar engine.

AT MISSOURI Dry Dock, the lovely *Lady Mignon* of Inland Oil and Transport Co., was getting a C-block installed

for the model 12-567 GM Cleveland engines boosting the hp on each engine from 900 to 1200 hp.

DEFENDER, a 119 x 34 ft. boat, will soon be in action for owners Industrial Marine Service, Memphis, with 2400 hp from two GM Cleveland 12-567's with C-block conversion.

ON THE Ohio, we spotted a familiar friend, the *Tri-State*, in unfamiliar waters, with a nice-size tow handled effectively with the 2000 hp received from Superior engines. Owned by Ashland Oil, the 145 ft. towboat was completed in 1942 by Calumet.

A BUSY boat, the *Robert P. Bonnie*, had a near-twenty-tow load on the Ohio using the Fairbanks-Morse OP power rated at 3000 hp. Built in 1949 for Lea River Lines by Sturgeon Bay, the power has worked for American Barge Lines since 1950.

TWO Caterpillar D397 turbocharged engines, along with two Cat D315 40 kw generators, were supplied by Stribling Bros., Greenwood, Miss., for the 650 hp *William B. Barnett II*. The twin-screw 75 x 24 ft. towboat, built by Greenville Barge Construction Corp., for owner American River Lines, will serve on the Tennessee River.

### Establish Con Diesel Western

The Consolidated Diesel Electric Corp., at Stamford, Conn. has announced the establishment of Con Diesel Western, a new western area division with facilities at 15519 Lanark St., Van Nuys, Calif. This division was formed to offer direct and local service to the aircraft and missile system manufacturers west of the Rocky Mountains. CDEC can now offer close engineering liaison during the design and development of the new ground support equipment required to support increasingly complex missile and jet aircraft systems. This division will design and manufacture equipment capable of furnishing hydraulic, pneumatic, electrical, mechanical, and electro-mechanical power services and testing. Key personnel have been brought from the Stamford facility. These are supplemented by personnel, well qualified in the support field, from the west coast area. Key personnel are: General Manager, Paul C. Mitchell, Jr.; Chief Engineer, R. H. Gaver and Purchasing Agent, I. J. Crowley.

### New White Diesel Catalog

The complete product line of drilling engines, diesel-electric drilling rig power plants, and engine-generator sets made for oil field applications by the White Diesel Engine division of the White Motor Co. is described in a 20-

page bulletin recently issued by the Springfield, Ohio, firm. Known as Bulletin #106, the catalog summarizes performance characteristics of 26 Superior engine models, offering a range of 200-2150 bhp and 150-1500 kw, naturally aspirated or supercharged, and operating on natural gas, diesel, or dual-fuel. The literature makes liberal use of action and product photos, cutaway and dimensional drawings, graphs, and specification tables for ready reference. A list of representatives and principal distributors is included on the back cover. Copies of Bulletin #106 are available at no charge from Dept. 712, White Diesel Engine Div., Springfield, Ohio.

ITS NEW

### Brochure on Ross A-100 Line

New, 8-page Bulletin 302.6K1, just released by American-Standard, Ross Heat Exchanger Division, presents the A-100 line of Ross pipeline after-coolers. Among principal features described and illustrated are: steel shell construction, removable corrosion-resistant tube bundle, counter current flow design, and a new, advanced centrifugal moisture separator. The fully standardized parts are said to eliminate high engineering costs and long delays involved in custom fabrication. Specifications give details on the 54 models with capacities designated for operating pressures up to 125 psig for single and two-stage compression. Copies of Bulletin 302.6K1 can be obtained by writing to American-Standard, Ross Heat Exchanger Division, Buffalo 5, N. Y.

ITS NEW

### Booklet on Air-Jacketed Silencers

How air-jacketed silencers suppress engine noise while they ventilate engine room and surrounding areas is told in an illustrated, four-page brochure by Emhart Manufacturing Company's subsidiary, The Maxim Silencer Co., Hartford, Conn. Included are descriptions, dimensions and applications of nine models.

ITS NEW

### Giant Marine Engine Purchased

One of the prominent figures in Norwegian shipping, the Owner Sigval Bergesen d.y., has signed a contract with Burmeister & Wain for delivery of a marine diesel engine with an exceptionally great output. It is a 10 cylinder turbocharged engine of Burmeister & Wain's newest type, with a cylinder bore of 840 mm and a stroke of 1,800 mm, developing 17,300 bhp—over 2,000 hp more than the largest marine diesel engine existing today. This huge engine is to be installed in a tanker of 49,500 tons deadweight which Sigval Bergesen d.y. intends to build at A/S Rosenberg Mek. Verksted, Stavanger, Norway.

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To Any  
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**60 CYCLE SIZES**  
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**SPEEDS**  
720, 900, 1200, 1800 RPM.

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## Gunter And Bransom Promoted By AiResearch

Promotions of Richard Gunter and George Bransom to the positions of assistant division manager and sales manager, respectively, have been announced by The Garrett Corporation's AiResearch Industrial Division. Mr. Gunter first joined the AiResearch manufacturing division in Sept., 1943, and transferred to the industrial division in Nov., 1954 as chief accountant. Mr. Bransom came into the organization with the AiResearch manufacturing division of Arizona (Phoenix) in Oct., 1955. He was employed as a project administrator in contract administration and later served in the



Richard Gunter



George Bransom

military relations department. Bransom was transferred to AiResearch industrial in August of this year. Prior to joining AiResearch, he was employed by the Bendix Aviation Corp.

## Hilco Develops Oil Reclaimer

The Hilliard Corp. has recently completed the development of the Hilco Hyflow oil reclaimer model 300-X. It is designed for full-flow purification of lubricating and sealing oil in 28 high



vacuum pumps, with a total oil circulating rate of 224 gph. The reclaimer system, fabricated in two sections, consists of inlet and outlet oil pumps, vacuum pumps, electrically heated vacuum vaporizer, distillate tank and duplex fullers earth filters. Outstanding features include the centrally located graphic control panel. The panel controls operate all pumps and indicates heater operation, solenoid positions, tank levels and flow characteristics. From this control panel are operated duplicate sets of inlet and outlet pumps and vacuum pumps, one set of each being employed as stand-by units. Also utilized in conjunction with distillate collection is an automatic draining distillate tank. Automatic recirculating features on the vacuum vaporizer will permit dry oil only (water less than 10 parts per million) to be pumped from the reclaimer to the vacuum pump delivery system. All electrical controls and motors are furnished to JIC Standards. The fullers earth filters may be operated either individually

or simultaneously. In addition to filtration, they serve to bleach and reduce acid in the oil. For further information, write The Hilliard Corp., Elmira, N.Y.

ITS NEW

## Waukesha Service Manager



Harvey R. Wilson

Mr. Harvey R. Wilson has been named manager of the Waukesha Motor Company's Service Division, according to an announcement made recently by James E. DeLong, president of the company. Mr. Wilson has been a part of Waukesha's service organization since 1927. Advancing from service stock procurement through the departmental division of stock control, and cost and pricing, he served as manager of service in the company's branch at San Francisco from 1932 to 1936. Returning to the factory at Waukesha to supervise field service engineers he later assumed additional executive duties, and with the sudden and rapid expansion of the armed forces spare parts business, he was put in complete charge of that special phase of service activities in 1943. For the past thirteen years, Wilson has served as executive assistant service manager with supervision over all operational functions of the Service Department. In his new post as service manager, he will direct all phases of the nation-wide Waukesha service organization activities.

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America's largest GM fuel injector rebuilder

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### DIESEL ELECTRIC GENERATOR SETS

- 600 RPM—Worthington BB5  
100kw 3/60/480
- 300 RPM—Fairbanks Morse 33F16  
1125kw 3/60/480

Complete With All Auxiliaries  
Other Sets From 20kw to 1200kw

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## DUAL FUEL ENGINES AND STRAIGHT DIESELS WITH GENERATORS

At A Fraction Of Their Original Cost

Make	Model	No. of Cyl.	RPM	HP	Generator	Complete Plant
1—Fairbanks-Dual Fuel	33F16	10	300	2000	2400/3/60	Yes
1—Fairbanks-Dual Fuel	33E16	8	300	1600	2400/3/60	Yes
1—Fairbanks-Dual Fuel	33E16	6	300	1200	2400/3/60	Yes
1—Fairbanks-Diesel	33D16	4	257	600	2400/3/60	Yes
1—Fairbanks-Diesel	33 16	4	257	600	2400/3/60	Yes
1—Fairbanks-Diesel	33E16	4	300	750	2400/3/60	Yes
2—Fairbanks-Diesel	33M16	4	257	600	2400/3/60	Yes
1—Fairbanks-Diesel	32 12	2	300	80	2400/3/60	No
1—Fairbanks-Dual Fuel	31A 8 1/2 D	8	514	520	2400/3/60	Yes
1—DeLavernne-Diesel	VM	6	300	750	2400/3/60	Yes
2—Caterpillar-Diesels		6	900	150	2400/3/60	Yes
5—Busch-Sulzer-Diesel		8	257	1000	2400/3/60	Yes

(The 5 above are identical—parts interchangeable)

We have used parts for Fairbanks, Nordberg, Worthington, Alco, McIntosh-Seymour, Busch-Sulzer, Enterprise, National Superior, DeLavernne and other makes of engines.

We buy and sell complete engine generator sets. Also, engine parts, new and used.

All engines for immediate delivery at low prices, subject to prior sale.

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What's it worth knowing  
the equipment will start in any  
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Only one battery made today can guarantee you the consistent breakaway power you want for dependable heavy duty starting—the Gulton "GO" nickel cadmium alkaline battery.

Reason: it delivers peak currents as high as 20 times rated capacity. That means more than

enough punch to start the orneriest engine on the coldest day.

If you're losing money on balky equipment, it's time to look into the many benefits of "GO" batteries. For example, maintenance: practically nil; service life: no other battery can beat it.

"GO" batteries cost more to begin with—5 times as much—but they soon pay their way in dependable starting. And they'll outlive the engine they're starting. Get full details on why more and more Diesel operators are turning to "GO" batteries for end economy. Write for Bulletin GO-300.



ALKALINE BATTERY DIVISION  
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## FLEXIBLE COUPLINGS

### Protect your PUMPS

### and other

### Indispensable

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Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running. They will protect your equipment and extend the life of your machines. Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

#### UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES:

- ▶ Freedom from Backlash
- ▶ Torsional Rigidity
- ▶ Free End Float
- ▶ Smooth Continuous Drive with Constant Rotational Velocity
- ▶ Visual Inspection While in Operation
- ▶ Original Balance for Life
- ▶ No Lubrication
- ▶ No Wearing Parts
- ▶ No Maintenance

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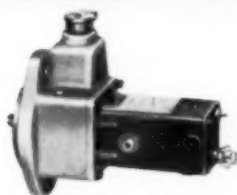
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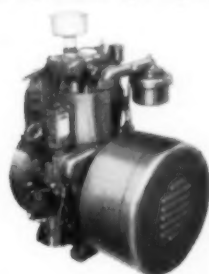
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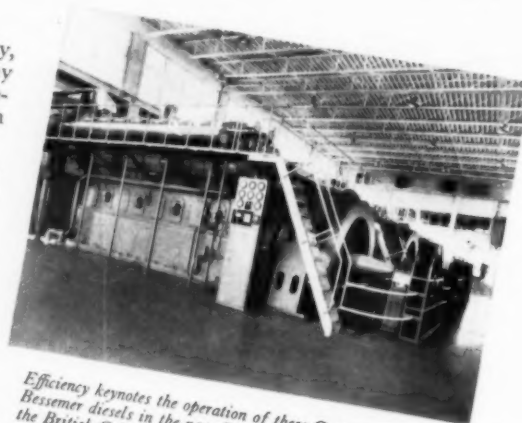
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